251

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Airline	WG-1572C	251-1
Airline	35BR-1557A, 35BR-1558A, 35BR-1559A	251-2
Arvin	651T (Ch. RE323)	251-3
Craftsmen	C210 (Ch. C210P & C210V)	251-4
Crestwood	Series 400 (401, 402) Recorder	251-5
Emerson	729B, 779B (Ch. 120170-B)	251-6
General Electric	564, 565, 566	251-7
Gotham	323 Tel. Rec.	251-8
Granco	LCU (UHF Conv.)	251-9
Hallicrafters	TW-500, TW-600 (Runs 1 & 2)	251-10
Mirrortone	Ch. 9047, 9055 Tel. Rec.	251-11
Mitchell	3D	251-12
Motorola	63LSS (Ch. HS-415)	251-13
RCA Victor	3-HES-5 (Ch. RS-146)	251-14
Rauland	1826 (1801A, 1805A)	251-15
Sonora	341, 349, 356	251-16
Steelman	3E1	251-17

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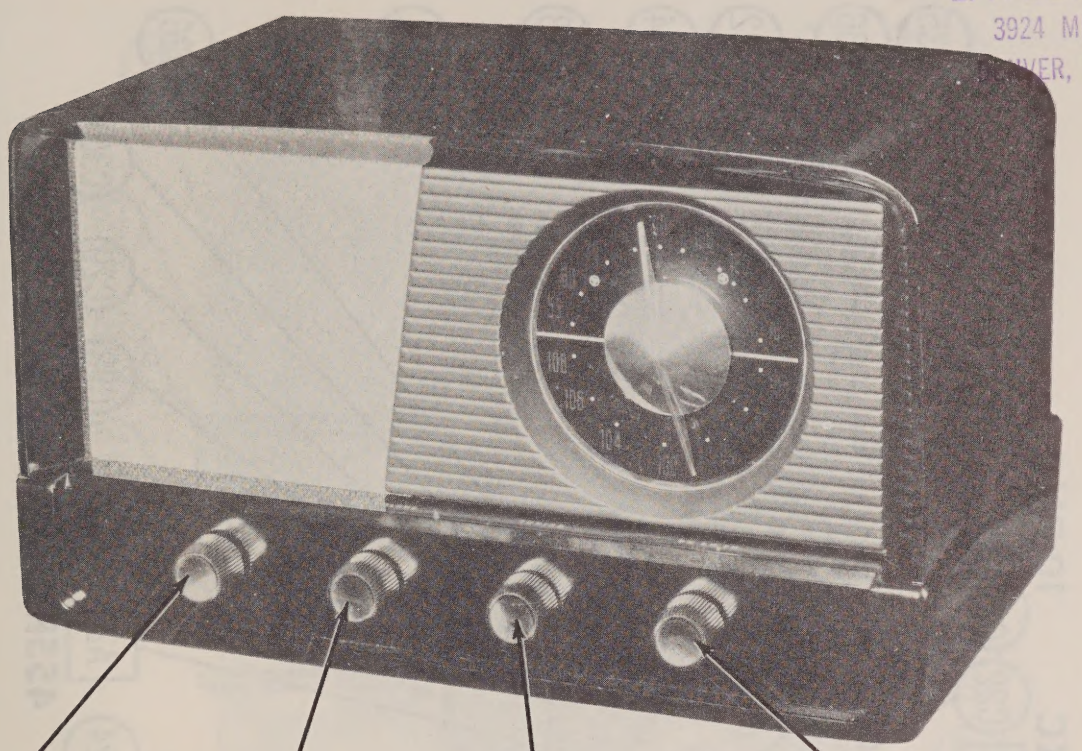
AIRLINE
MODEL WG-1572C



AIRLINE
MODEL WG-1572C

TRADE NAME	Airline Model WG-1572C	
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.	
TYPE SET	AC Operated AM-FM Superheterodyne Receiver	
TUBES (Eight)	Types 6BJ6 FM RF Amp., 6CB6 FM Conv.-AM Osc., 6AU6 1st. FM IF Amp.-AM Mixer, 6BA6 FM-AM IF Amp., 6AL5 Ratio Det., 6AV6 AM Det.-AF Amp., 6AQ5 Audio Output, 6X5GT Rectifier	
POWER SUPPLY	105-125 Volts AC-50/60 Cycles	RATING .32 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	540-1600KC	FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
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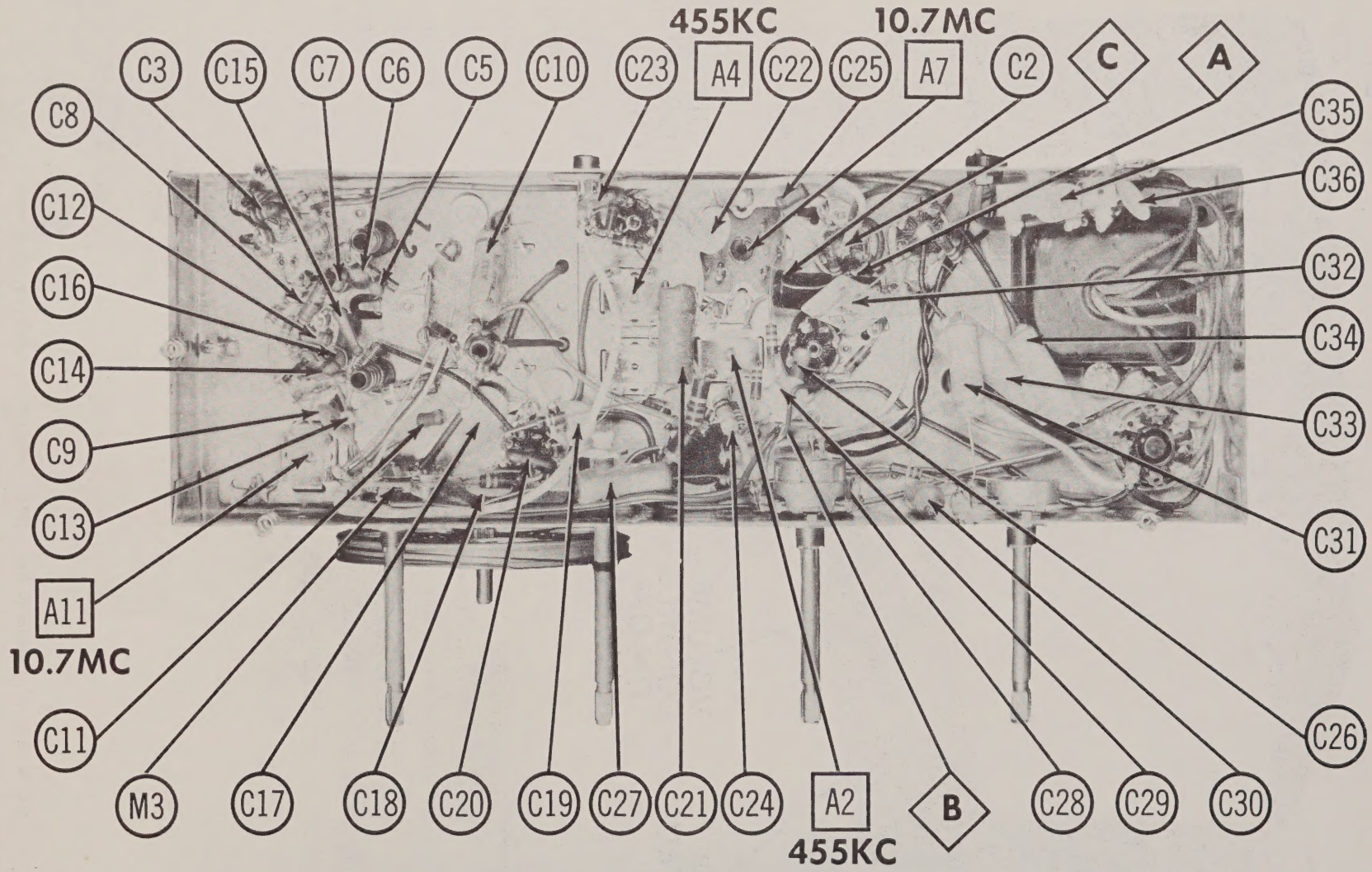
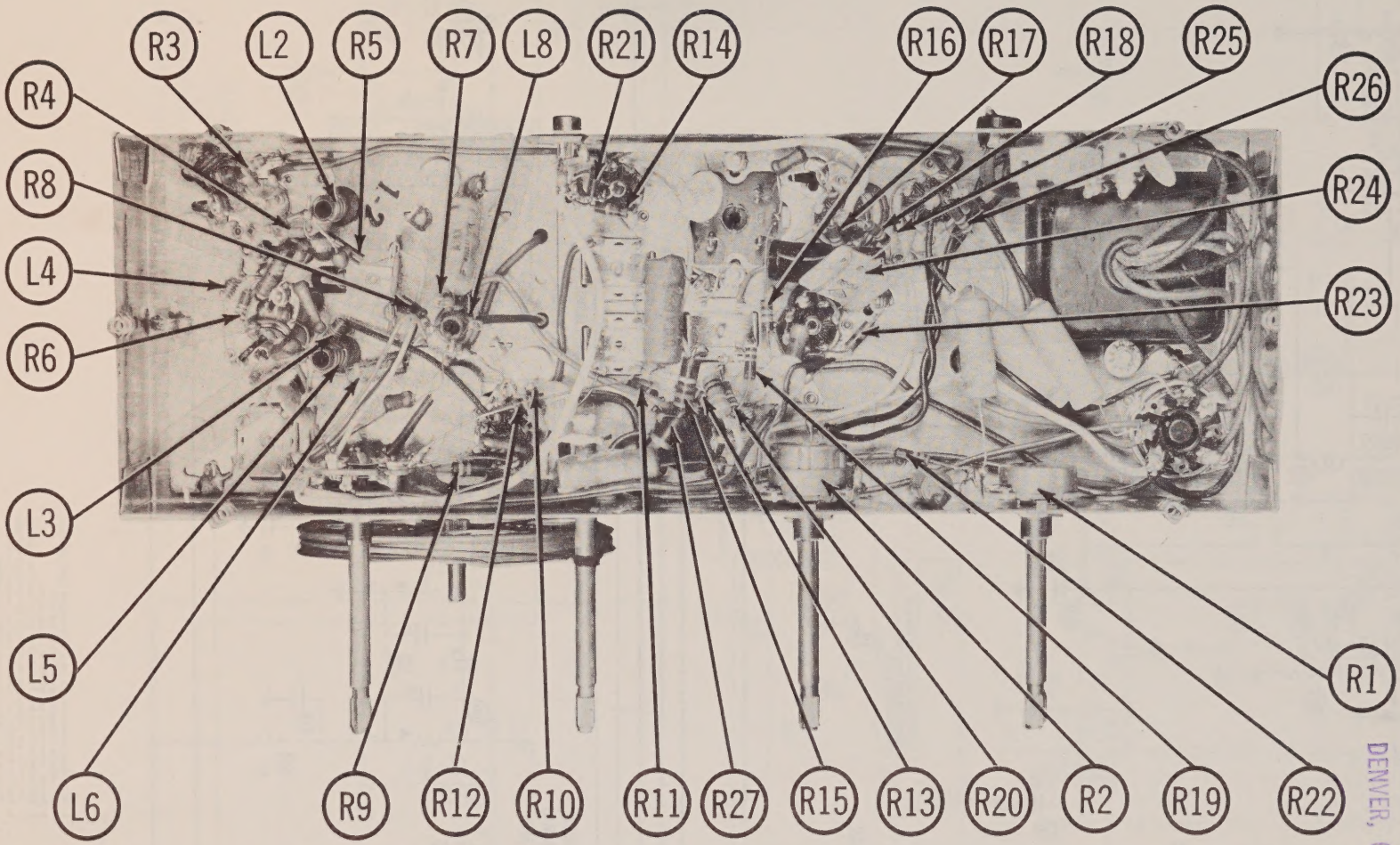


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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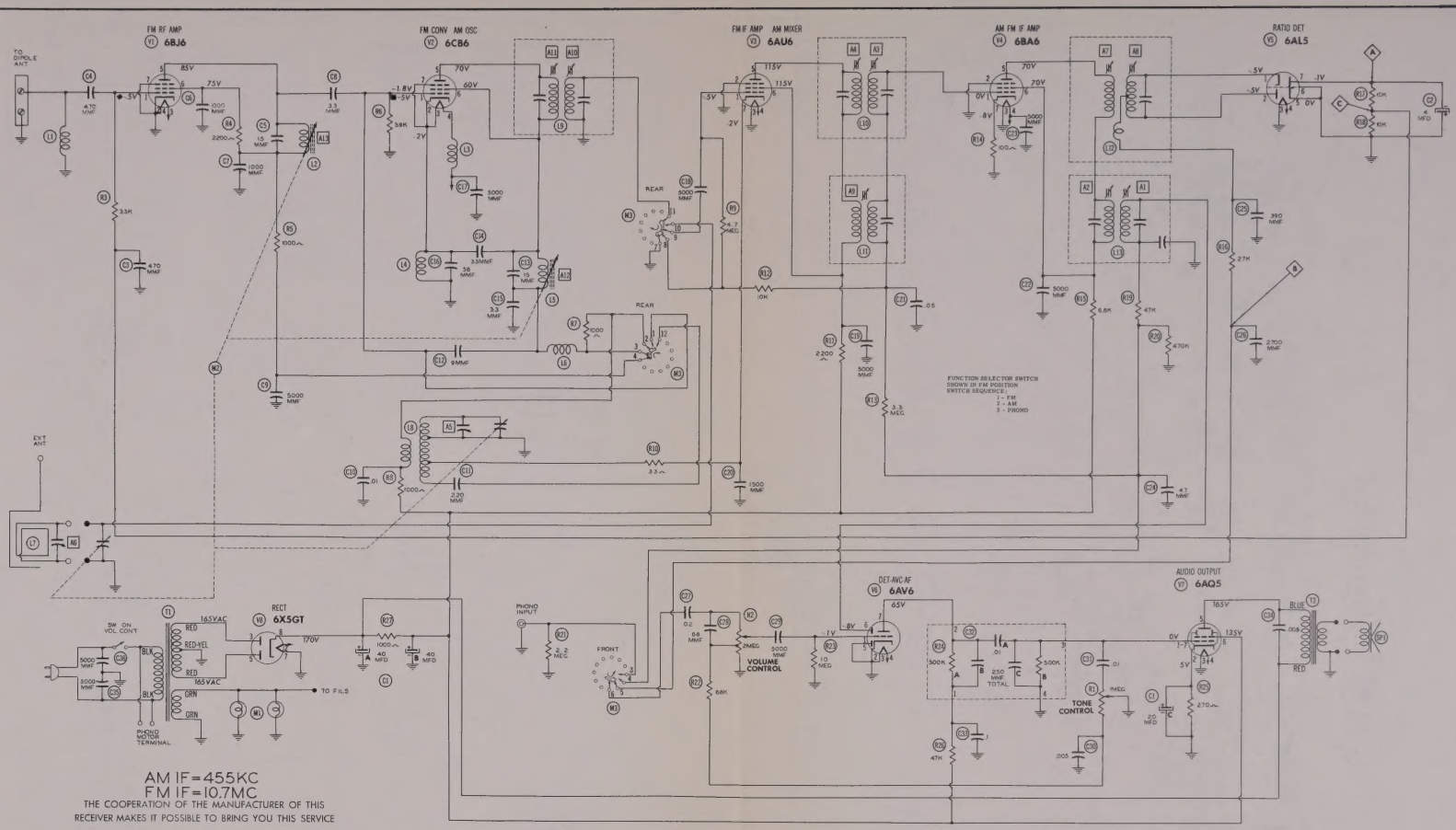

AM IF = 455KC
FM IF = 10.7MC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6BJ6	43KΩ	0Ω	.1Ω	0Ω	↑ 4KΩ	↑ 6.2KΩ	0Ω	
V 2	6CB6	39KΩ	0Ω	0Ω	.1Ω	↑ 2KΩ	↑ 2KΩ	0Ω	
V 3	6AU6	4.7Meg	0Ω	0Ω	.1Ω	↑ 2.2KΩ	13.5KΩ	33Ω	
V 4	6BA6	10KΩ	0Ω	0Ω	.1Ω	↑ 7.6KΩ	↑ 7.6KΩ	100Ω	
V 5	6AL5	INF	INF	0Ω	.1Ω	0Ω	0Ω	20KΩ	
V 6	6AV6	10 Meg	0Ω	0Ω	.1Ω	0Ω	530KΩ	↑ 550KΩ	
V 7	6AQ5	500KΩ	270Ω	0Ω	.1Ω	↑ 500Ω	↑ 1KΩ	500KΩ	
V 8	5X5GT	INF	3Ω	130Ω	INF	130Ω	INF	0Ω	150KΩ

ALL MEASUREMENTS ARE IN FM POSITION UNLESS OTHERWISE DESIGNATED.
• MEASURED IN AM POSITION.
↑ MEASURED FROM PIN 5 OF V8

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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251-1

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of dial.

AM ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 1 (grid) of 6AU6 (V3). Low side to chassis.	455KC (400∿Mod)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1620KC	"	"	"	A5	"
3.	50MMF	High side to external antenna terminal. Low side to chassis.	1400KC	"	Tune to 1400KC signal	"	A6	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Attenuate generator output to maintain not more than -3 volts on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.005MFD	High side to pin 1 (grid) of 6AU6 (V3). Low side to chassis.	10.7MC (Unmod)	FM	Tuning gang fully open	DC probe to point Ⓐ. Common to chassis.	A7, A9	Adjust for maximum deflection.
5.	"	High side to pin 1 (grid) of 6BJ6 (V1). Low side to chassis.	"	"	"	"	A10, A11	"
6.	"	"	"	"	"	DC probe to point Ⓑ. Common to point C.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.005MFD	High side to pin 1 (grid) of 6AU6 (V3). Low side to chassis.	10.7MC (450KC Swp)	FM	Tuning gang fully open	Vert. Amp. to point Ⓐ. Low side to chassis.	A7, A9	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
5.	"	High side to pin 1 (grid) of 6BJ6 (V1). Low side to chassis.	"	"	"	"	A10, A11	"
6.	"	"	"	"	"	Vert. Amp. to point Ⓑ. Low side to chassis.	A8	Reconnect stabilizing capacitor C2. Adjust so that 10.7MC occurs at center of crossover lines as in Fig. 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

Attenuate generator output to maintain not more than -3 volts on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	300Ω Carbon Resistor	High side to FM antenna terminal. Low side to chassis.	92MC	FM	92MC	DC probe to point Ⓐ. Common to chassis.	A12, A13	Adjust for maximum deflection.

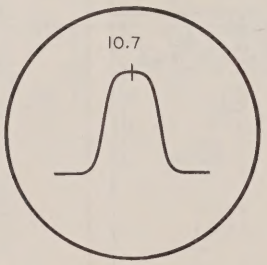


FIG. 1

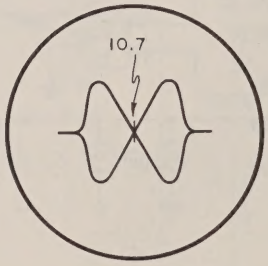


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	FM RF Amplifier	6BJ6	6BJ6	7CM	
V2	FM Conv. -Am. Osc.	6CB6	6CB6	7CM	
V3	1st FM IF Amp. - AM Mixer	6AU6	6AU6	7BK	
V4	FM AM IF Amp.	6BA6	6BA6	7BK	
V5	Ratio Detector	6AL5	6AL5	6BT	
V6	Det-AF Amplifier	6AV6	6AV6	7BT	
V7	Audio Output	6AQ5	6AQ5	7BZ	
V8	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

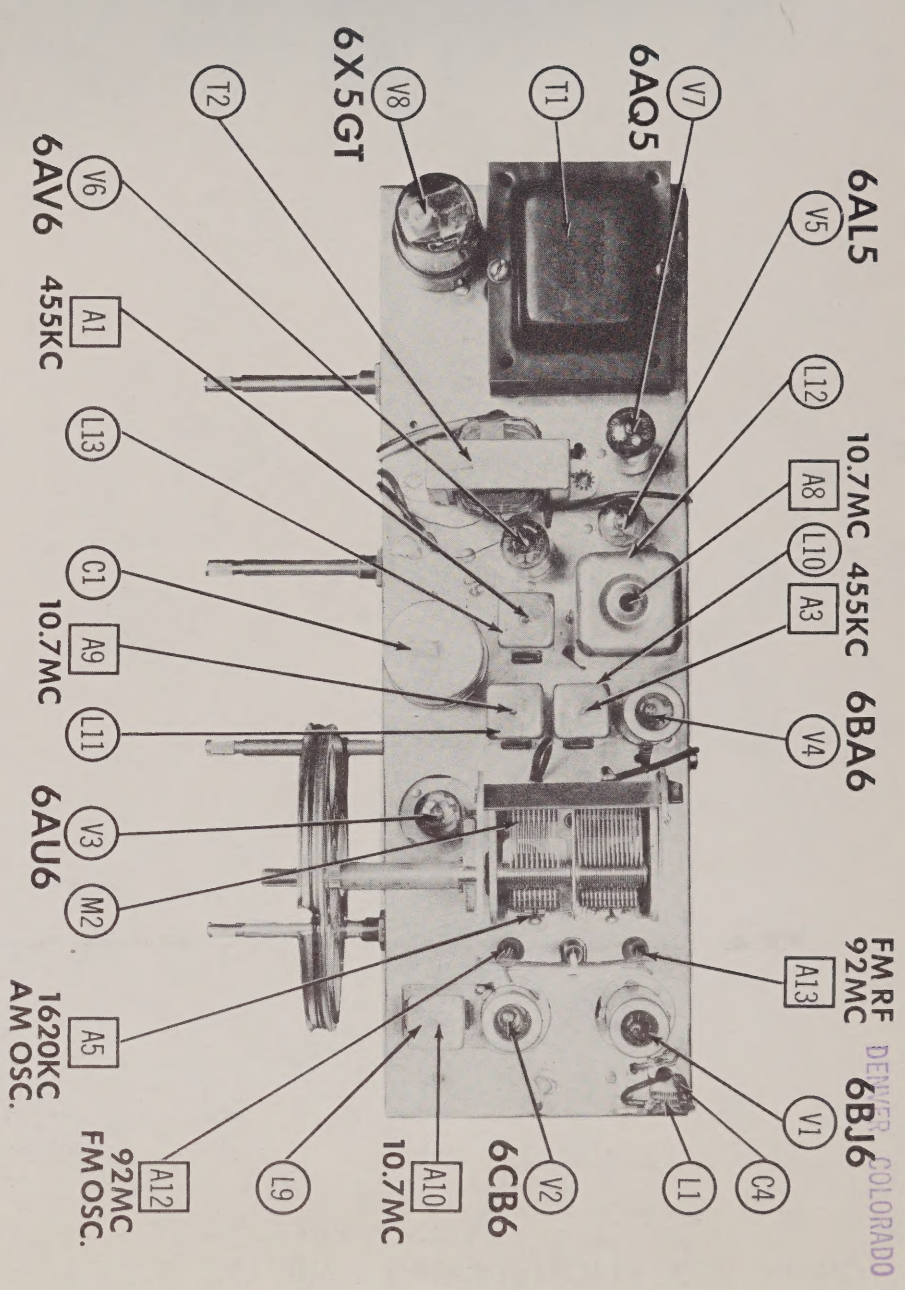
ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: AIR LINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	200	45X406	AFH3-100		C087		FP346	TVL-3786	
B	■40	200								
C	▲20	25								
C2	4	100	47X361	PRS150/4		BR415		TC40	TVA-1402	
C3	470		47X622	SI470	D6-471	TP46	GP1K-471	UC-5347	5GA-T47	
C4	470		47X622	SI470	D6-471	TP46	GP1K-471	UC-5347	5GA-T47	
C5	15		47X617	SI15	D6-150	TP11	GP1K-150	UC-5415	5GA-Q15	
C6	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C7	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C8	33		47X619	SI33NP0		TZ18	NP0K-180	ZT-5433	5TCC-Q33	
C9	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C10	.01	200		P288-01	D6-103	PJ2S1	GP2-333-103	PT411	2TM-S1	
C11	220			SI220	D6-221	TP39	GP2L-221	UC-5322	5GA-T22	
C12	9		47X616	SI9NP0			NP0K-090			
C13	15			SI15	D6-150	TP11	GP1K-150	UC-5415	5GA-Q15	
C14	33		47X619	SI33NP0	TCZ-33	TZ18	NP0K-180	ZT-5433	5TCC-Q33	
C15	33		47X619	SI33NP0	TCZ-33	TZ18	NP0K-180	ZT-5433	5TCC-Q33	
C16	56		47X625	SI56NP0	TCZ-56	TZ24	NP0K-560			
C17	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C18	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C19	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C20	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C21	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C22	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C23	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C24	47			SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C25	390		47X623	SI390	D6-391	TP44	GP2L-391	UC-5339	5GA-T39	
C26	2700		47X575	SI2700	D6-272	TP59	GP2L-272	UC-5227	5GA-D27	
C27	.02	200		P288-02	DF-203	PJ2S2		PT412	2TM-S2	
C28	68	500		1469-00007		5W5Q68			MS-47	
C29	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C30	.005	200		P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C31	.01	200		P288-01	D6-103	PJ2S1	GP2-333-103	PT411	2TM-S1	
C32A	1000									
B	250		♦76X5	♦PA-112-3	♦PC-80	♦113TM1	♦1404-01		♦102C1	
C										
C33	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C34	.005	800	RCP10W8502M	P1088-005		CUB10D5		PT1025	MB-D5	
C35	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C36	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	

♦ Items C32A, C32B, C32C, R24A and R24B are combined in one unit.
When replacing items separately, items C32B and C32C should total 250MMF.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg	1/2	B40X344A	Q11-137	A47-1Meg-S	AB-69	U-54	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
R2	2 Meg	1/2	36X391				UT-448	Volume & switch -tapped@ 500K

CHASSIS—TOP VIEW



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIRLINE PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R3	33KΩ	1/2		BTS-33K	
R4	2200Ω	1/2		BTS-2200	
R5	1000Ω	1/2		BTS-1000	
R6	39KΩ	1/2		BTS-39K	
R7	1000Ω	1/2		BTS-1000	
R8	1000Ω	1/2		BTS-1000	
R9	4.7Meg	1/2		BTS-4.7Meg	
R10	33Ω	1/2	B84330	BTS-33	
R11	2200Ω	1/2		BTS-2200	
R12	10KΩ	1/2		BTS-10K	
R13	3.3Meg	1/2		BTS-3.3Meg	
R14	100Ω	1/2		BTS-100	
R15	6800Ω	1		BTS-6800	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIRLINE PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R16	27KΩ	1/2		BTS-27K	
R17	10KΩ	1/2		BTS-10K	
R18	10KΩ	1/2		BTS-10K	
R19	47KΩ	1/2		BTS-47K	
R20	470KΩ	1/2		BTS-470K	
R21	2.2 Meg	1/2		BTS-2.2Meg	
R22	68KΩ	1/2		BTS-68K	
R23	10 Meg	1/2		BTS-10 Meg	
R24A	500KΩ	1/2	♦ 76X5		
B	500KΩ	1/2			
R25	270Ω	1/2		BTS-270	
R26	47KΩ	1/2		BTS-47K	
R27	1000Ω	2		BTB-1000	

♦ Items R24A, R24B, C32A, C32B, C32C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA AIRLINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ .32A	348VCT .076ADC	6.3VAC @ 2.9A		53X322					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA AIRLINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T2	5.2KΩ	3.5Ω	51X162A	A-3849	A-3019	S-5Z	Z1006	26S49	

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA AIRLINE PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	6"	PM	3.5Ω	12A517	ST-108 Mod. P6-X	6A1	

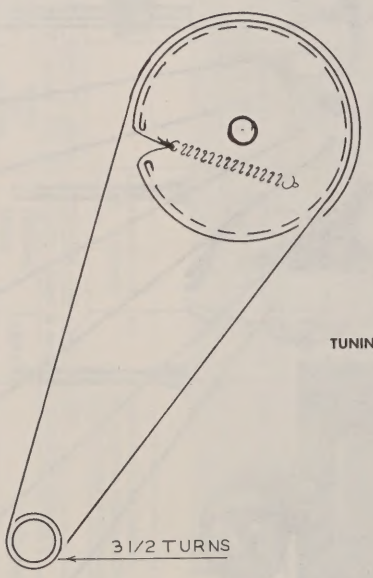
COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Coil	0Ω		9A2305				
L2	FM RF Coil	0Ω		9A2300				.2 Microhenry
L3	Fil. Choke	0Ω		9A2303				.02 Microhenry
L4	Cathode Choke	0Ω		9A2306				
L5	FM Osc. Coil	0Ω		9A2301				.47 Microhenry; IRC Part # CLA
L6	RF Choke	.22Ω		35A9				
L7	AM Loop Ant.	0Ω	1.2Ω	9A2324				
L8	AM Osc. Coil	2.9Ω	6Ω	9A2302	14-1060		71-Osc.	Sec. tapped @ .2Ω & @ .4Ω
L9	1st FM IF	.9Ω	.9Ω	9A2310	16-3487	FM-254	1463	
L10	1st AM IF	13Ω	14Ω	9A2308	16-6758	BC-352	12-C1	
L11	2nd FM IF	.3Ω	.3Ω	9A2309	16-3487	FM-254	1463	
L12	Ratio Det.	1.9Ω	.1ΩCT	9A2260	17-3487	FM-252	1453	Tertiary winding=.25Ω
L13	2nd AM IF	15Ω	14Ω	9A2307	16-6770	BC-355	12-C6	

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M1	Dial light	7A32	# 51 (some receivers use 2 lamps in parallel)
M2	Tuning cap	14A223-4	(21-432MMF, 11-130MMF)
M3	Switch	2A434	Function
A6	Trimmer cap	17A256	Loop antenna (2-24MMF)
	Cabinet	55X425	Plastic, black
	Knob	10A802	4 used



DRIVE CORD STRINGING

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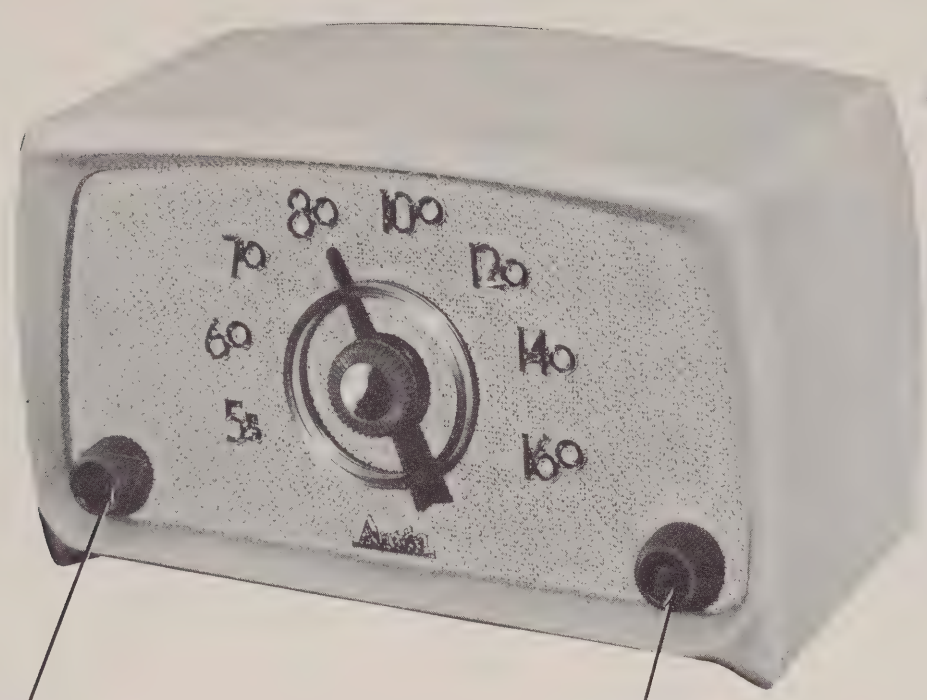
3974 MEADE ST.
DENVER, COLORADO

ARVIN
MODEL 651T (Ch. RE323)



VOLUME CONTROL ON-OFF SWITCH

TUNING CONTROL

ARVIN
MODEL 651T (Ch. RE323)

TRADE NAME	Arvin Model 651T (Ch. RE323)
MANUFACTURER	Arvin Industries, Columbus, Indiana
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to antenna stator lug on tuning gang. Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1400KC	1400KC	"	A5, A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	600KC	Tune to 600KC signal	"		Check tracking at 600KC. If necessary bend slotted antenna plates on tuning gang for maximum output. Repeat step 2.

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PARTS LIST AND DESCRIPTIONS

ARVIN
MODEL 651T (Ch. RE323)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ARVIN PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det-AVC-AF Amp.	12AT6	12AT6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	20	150	C23470	PRS150/40-20-20		BBRT42215		TN129	TVA-3451	Red
B	40	150								Blue
C	20	150								Green
C2	.05	200	C20067-503	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	4.7		A20238-6	SI4.7NP0	TCZ-4.7	TZ07	NP0K-4R7	ZT-5547	5GA-Q47	
C4	250	500	C20065-251	1469-00025		5W5T25		MCE240	1FM-325	
C5	.01	400	C20068-103	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C6A	10000									
B	250		♦A24084	♦PA-112-3	♦PC-80	♦113TM1	♦1404-01		♦T-1	
C										
C7	.01	400	C20068-103	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C8	.05	200	C20067-503	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C9	.05	400	C20068-503	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C10	.05	400	C20068-503	P488-05	DF-503	CUB4S5		PT415	4TM-S5	

♦ Items C6A, C6B, C6C, R8A and R8B are combined in one unit.
When replacing items individually items C6B and C6C should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ARVIN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1 Meg	½	C25576	Q13-137	A47-1Meg-Z	AB-744	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ARVIN PART No.	IRC PART No.	
R2	22KΩ	½	C20061-223	BTS-22K	
R3	47Ω	½	C20061-470	BTS-47	
R4	2.2Meg	½	C20061-225	BTS-2.2Meg	
R5	330Ω	½		BTS-330	Note
R6	2200Ω	½	C20061-222	BTS-2200	
R7	4.7Meg	½	C20061-475	BTS-4.7Meg	
R8A	500KΩ	½	♦A24084		
B	500KΩ	½			

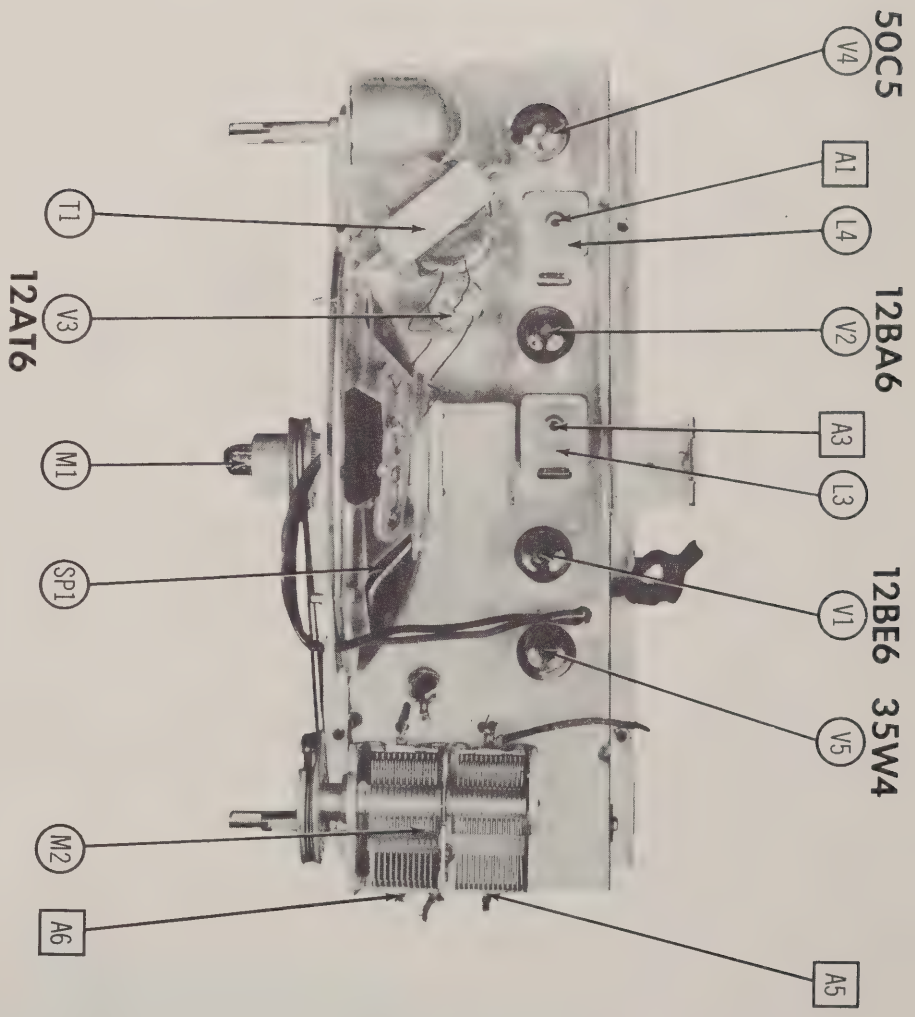
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ARVIN PART No.	IRC PART No.	
R9	120Ω	½	C20120-121	BTS-120	
R10	1200Ω	1	C20070-122	BTA-1200	
R11	120Ω	1	C20070-121	BTA-120	
R12	15Ω	½	C20061-150	BTS-15	
R13	150Ω	½	C20061-151	BTS-150	
R14	330KΩ	½	C20061-334	BTS-330K	

Note. Some models may use a 470Ω resistor in this application.
♦ Items R8A, R8B, C6A, C6B, C6C are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ARVIN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.3KΩ	3.7Ω	23464-1	A-3332	A-3025	S-12X	Z1101		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ARVIN PART No.	JENSEN PART No.	QUAM PART No.	
SP1	5"	PM	3.7Ω	C23467	ST-105 Mod. P5-X	5A07	

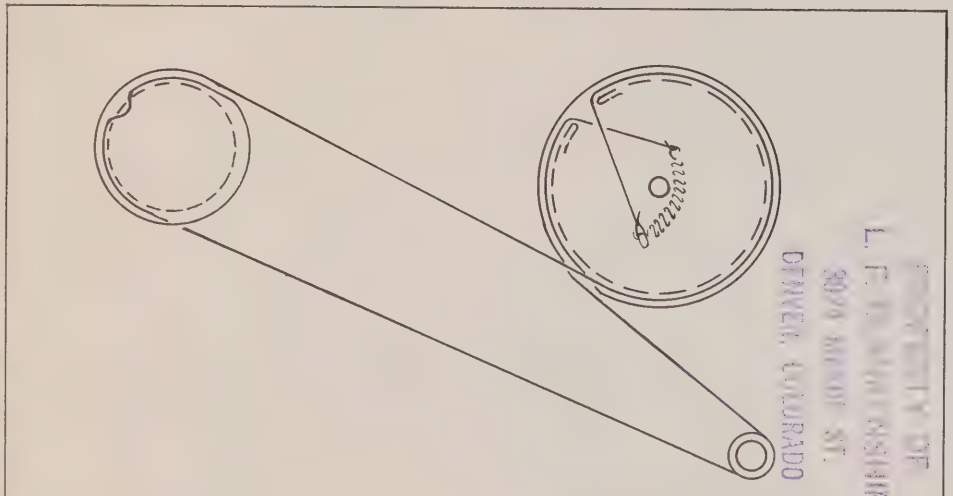
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ARVIN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	1.3Ω		D25572				Includes rear cover
L2	Osc. Coil	.5Ω	6.5Ω	AC24210-1	14-1073		69-Osc. †	
L3	Input IF	20Ω	20Ω	C21797-16	16-6758	BC-352	12-C1	
L4	Output IF	20Ω	20Ω	C21797-16	16-6758	BC-353	12-C2	

† Drill mounting hole.

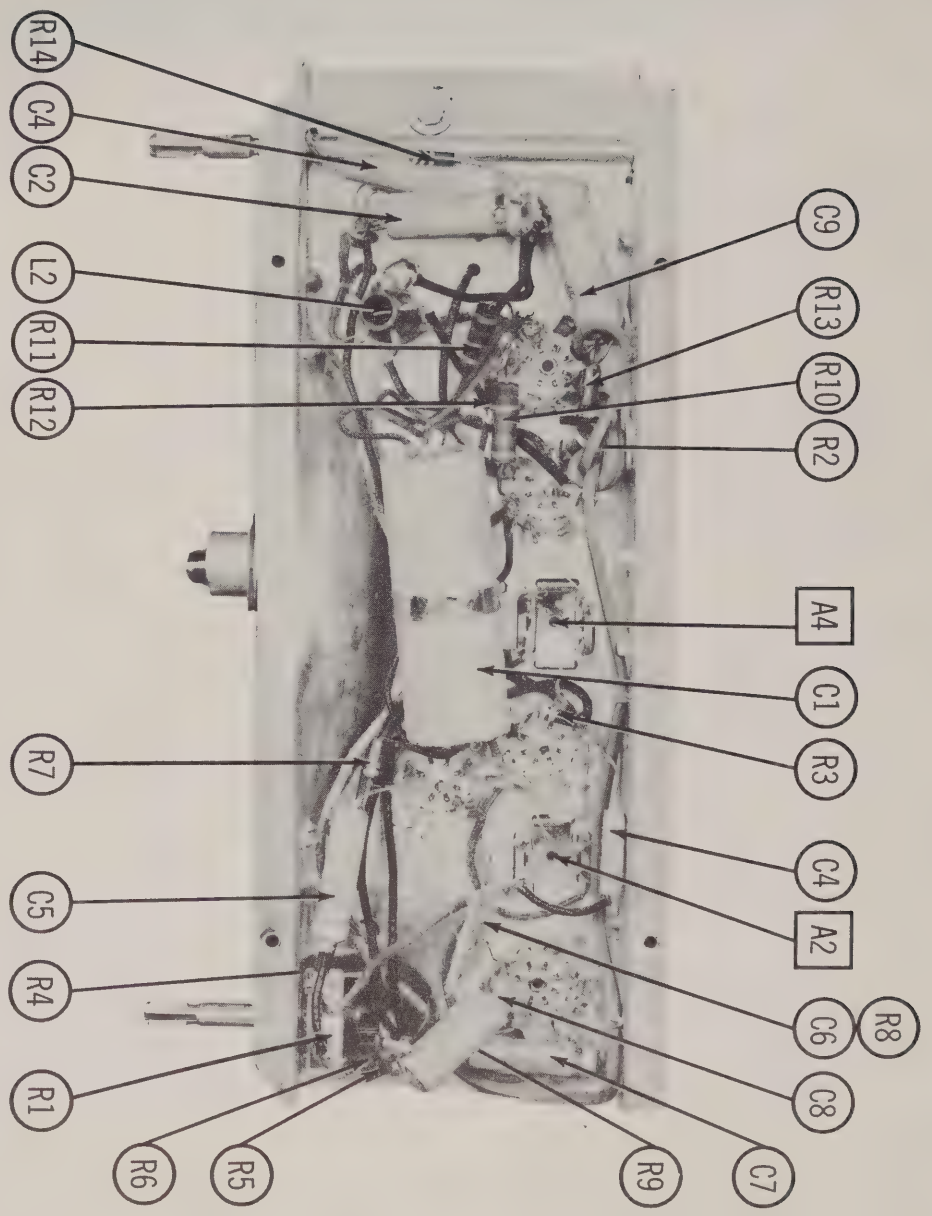
MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M1	Dial light	A19351	# 47 bayonet
M2	Tuning cap	C25569	(34-475MMF) (22-165MMF)
	Cabinet	R25546-1	Ivory
	Cabinet	R25546-2	Willow green
	Cabinet	R25546-3	Tan
	Cabinet	R25546-4	Ebony
	Knob	A25558-1	Ivory
	Knob	A25558-2	Green
	Knob	A25558-3	Tan
	Knob	A25558-4	Ebony
	Pointer	D25556-1	Ivory
	Pointer	D25556-2	Green
	Pointer	D25556-3	Tan
	Pointer	D25556-4	Ebony



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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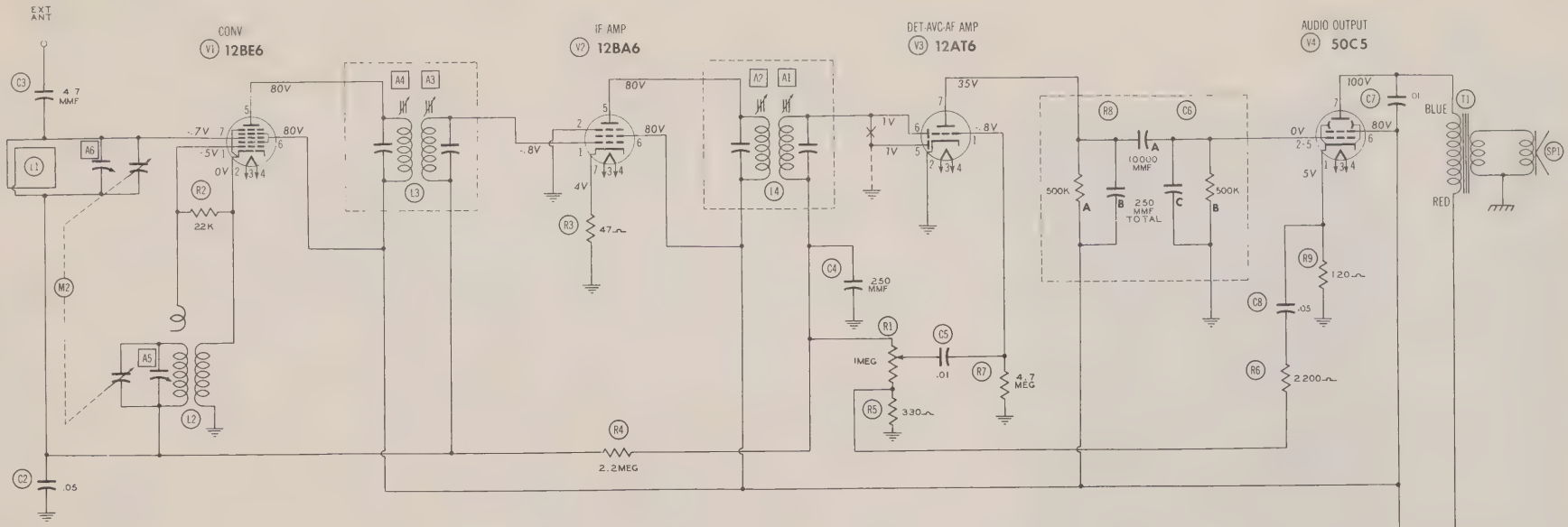
ARVIN MODEL 651T (Ch. RE323)



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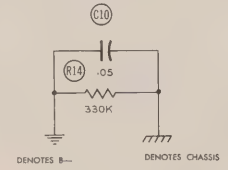
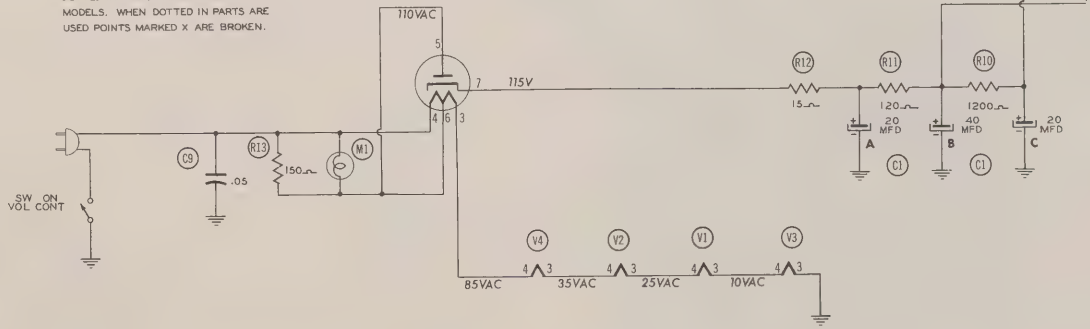


Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.

RECT
V5 35W4



1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	14Ω	27Ω	† 1.3KΩ	† 1.3K Ω	3.2Meg
V 2	12BA6	3.2KΩ	0Ω	27Ω	38Ω	† 1.3KΩ	† 1.3KΩ	47Ω
V 3	12AT6	4.7Meg	0Ω	0Ω	14Ω	1 Meg	1 Meg	† 500KΩ
V 4	50C5	120Ω	500KΩ	38Ω	90Ω	500KΩ	† 1.3KΩ	† 315Ω
V 5	35W4	† 15Ω	† 135Ω	90Ω	125Ω	120Ω	120Ω	70KΩ

† MEASURED FROM PIN 7 OF V5.

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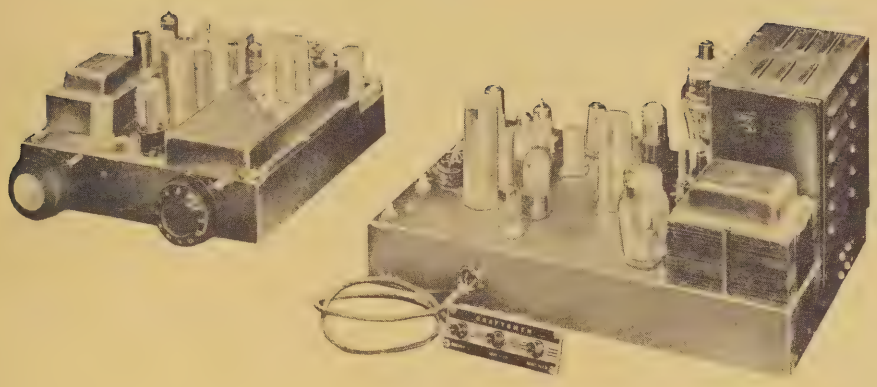

CRAFTSMEN
MODEL C210 (Ch. C210P & C210V)

MODEL C210

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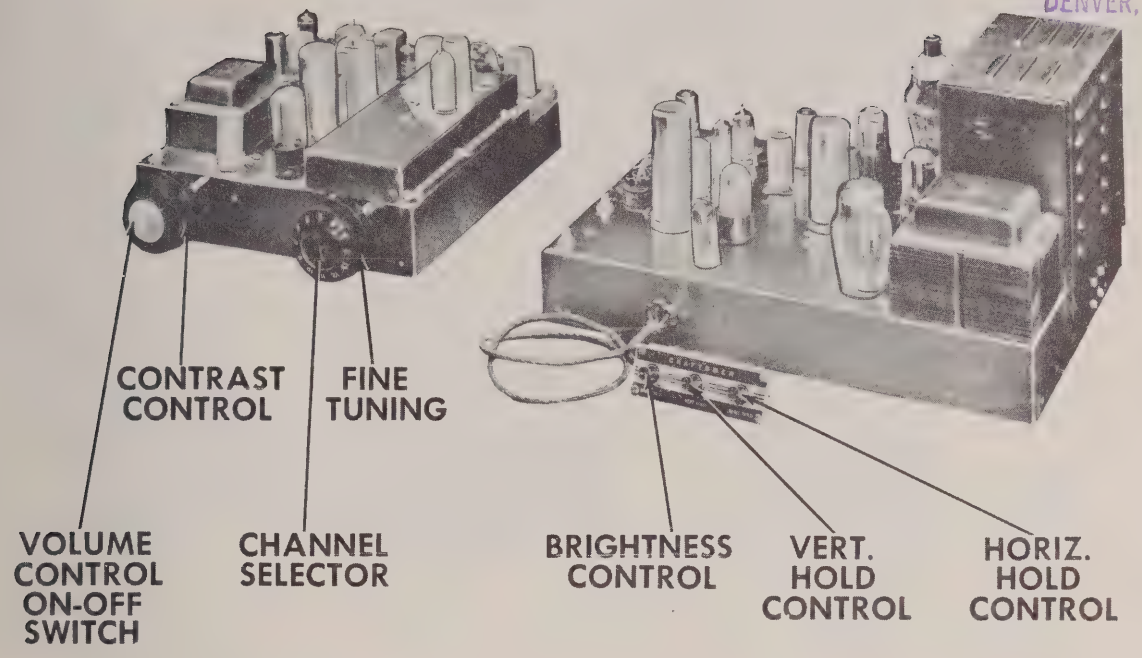

TRADE NAME	Craftsmen Model C210 (C210V RF-IF Chassis, C210P Sweep Chassis)
MANUFACTURER	Radio Craftsmen, Inc., 4401 N. Ravenswood Ave., Chicago 40, Ill.
TYPE SET	Television Receiver for Custom Installation
TUBES	Twenty-seven
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .62 Amp. @ 117 Volts AC (RF-IF Chassis); 1.75 Amp. @ 117 Volts AC (Sweep Chassis)
TUNING RANGE	Channels 2 thru 13, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

INDEX

Alignment Instructions 6, 7
Horizontal Sweep Circuit Adjustments 18
Parts List and Descriptions ..... 13 thru 16
Photographs
Capacitor (Sweep Chassis) 4, 9
Chassis-Bottom View (RF-IF Chassis) 11
Chassis-Top View (RF-IF Chassis) 3
Chassis-Top View (Sweep Chassis) 3
RF Tuner 10
Resistor Identification (Sweep Chassis)..... 19, 20
Photographs (Cont)
Trans., Inductor & Alignment Identification (Sweep Chassis) 17
Video IF strip 7
Resistance Measurements 8
Servicing in the Field 18
Schematic 2
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

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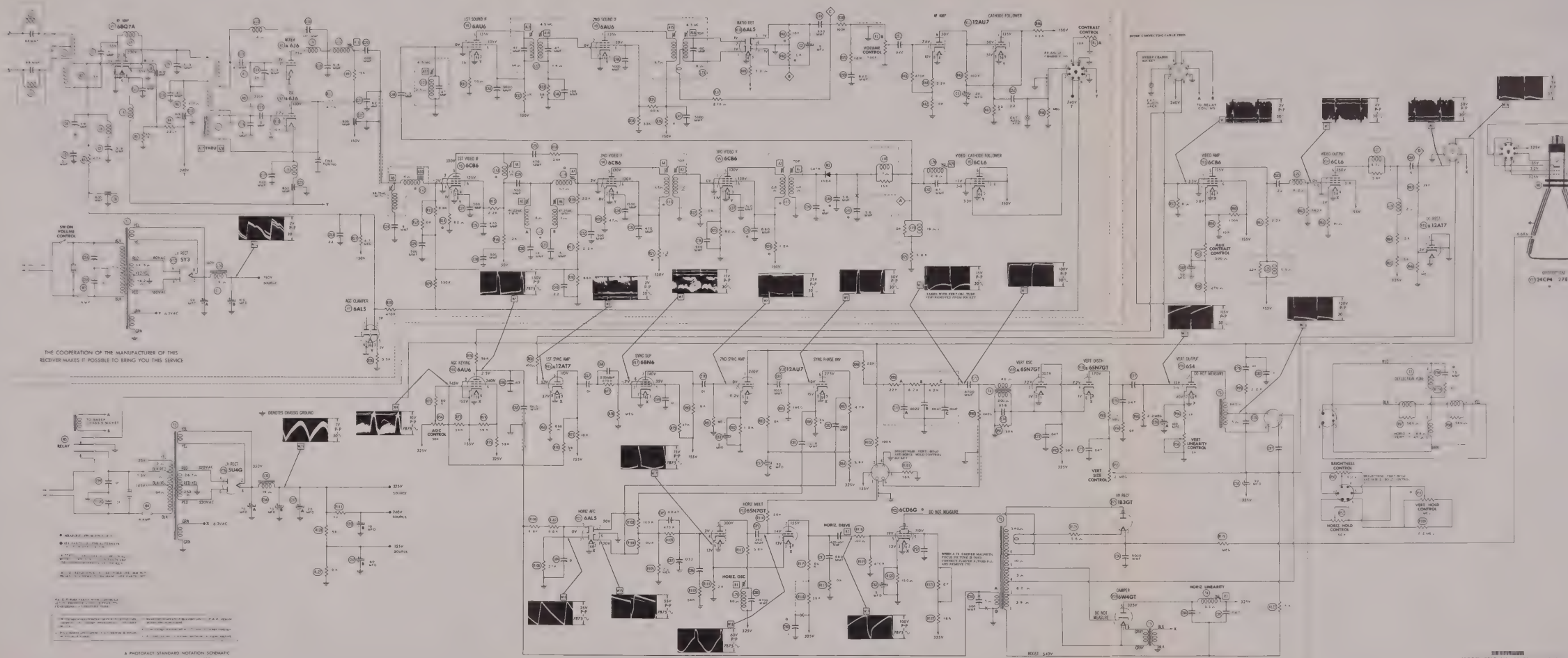
CRAFTSMEN
MODEL C210 (Ch. C210P & C210V)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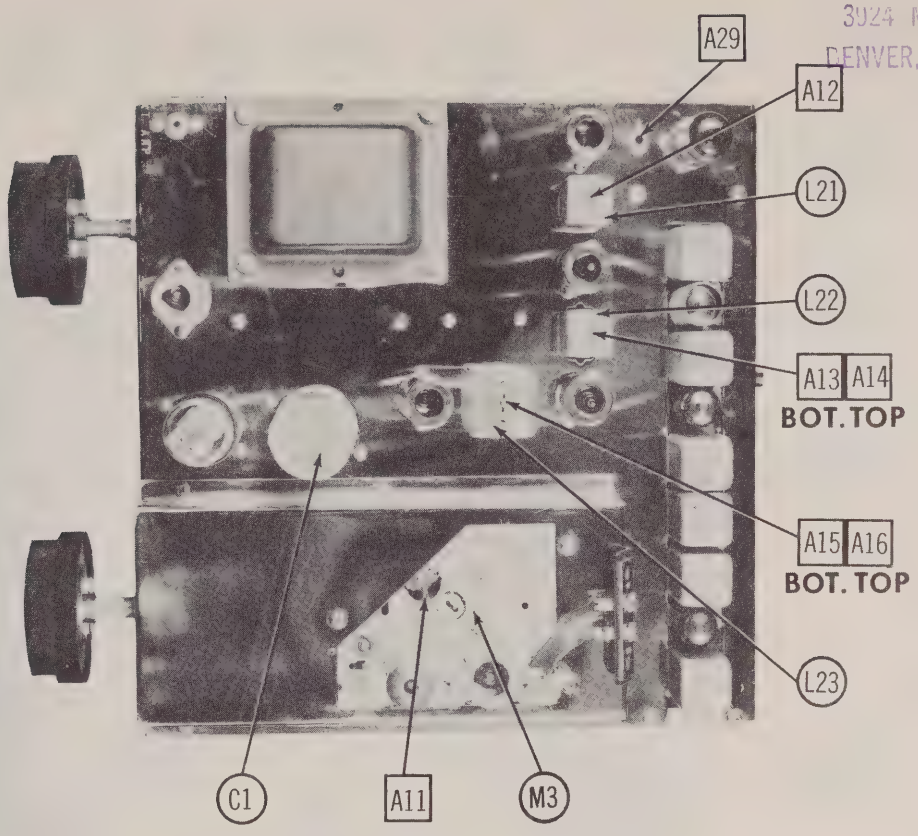
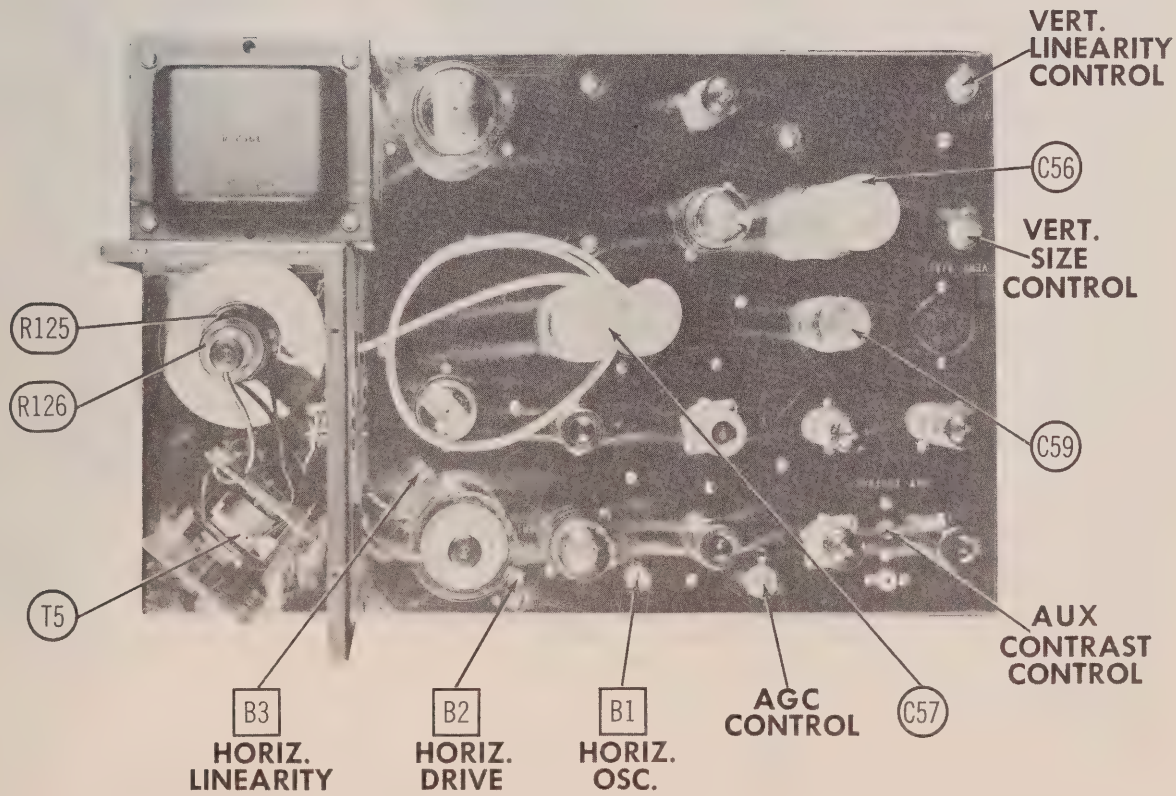
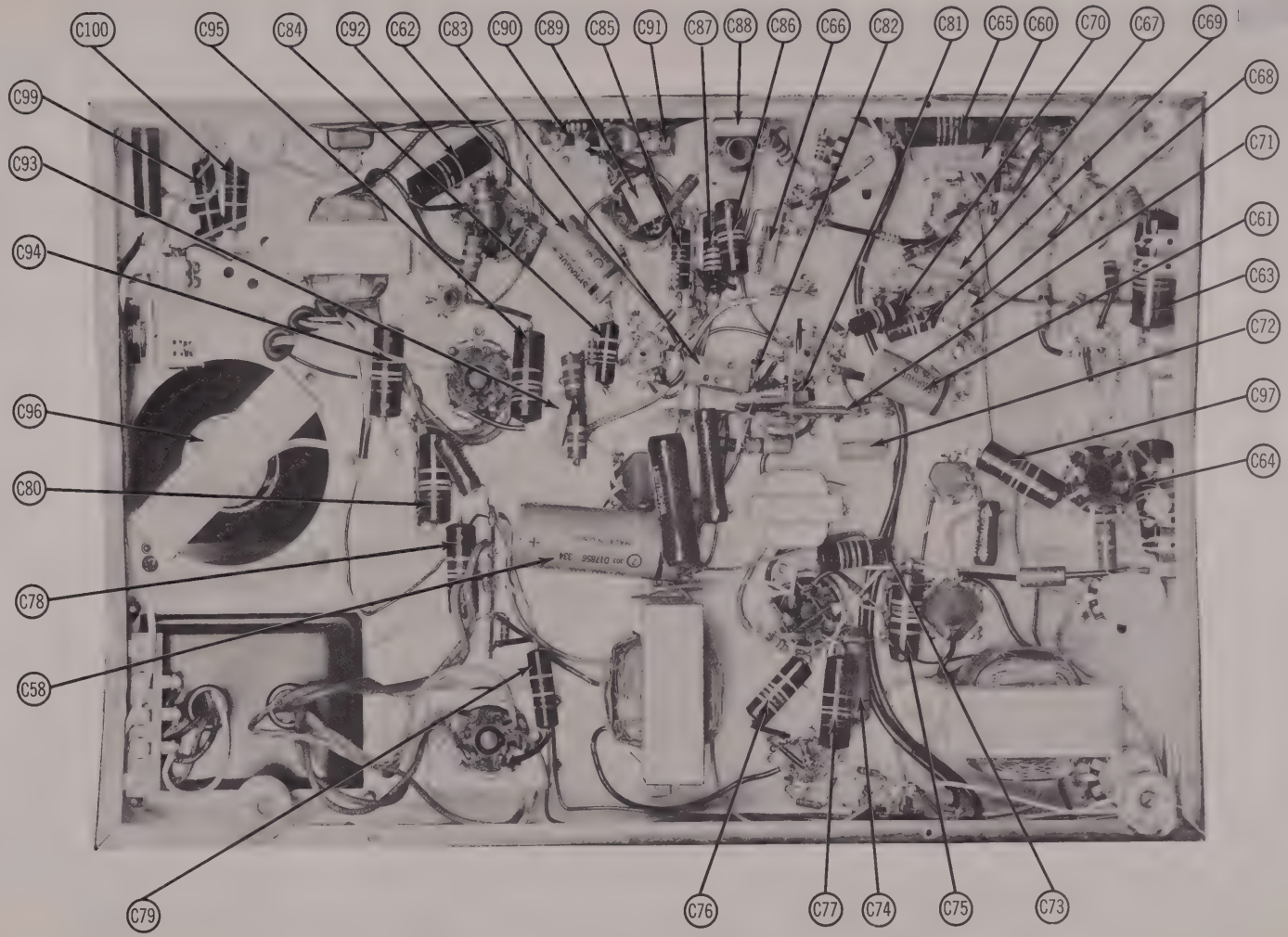


RF-IF CHASSIS-TOP VIEW

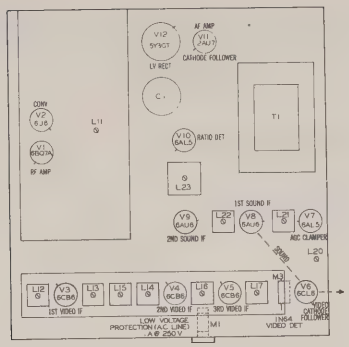


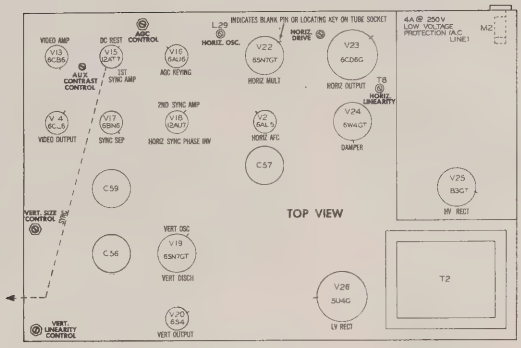
SWEEP CHASSIS-TOP VIEW



SWEEP CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART





TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V12, V21, Fuse (M1 & M4)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V13, V14, V27
Has pic, no sound - V8, V9, V10, V11
Overloaded picture - V7, V16

SYNC FAILURE
No vert. sync - V18, V19
No horiz. sync - V18, V21, V22
No vert. or horiz. sync - V15, V17, V18

SWEEP FAILURE
No raster, has sound - V22, V23, V24, V25, V27
No vertical deflection - V19, V20
Poor vert. linearity or foldover - V19, V20
Poor horiz. linearity or foldover - V22, V23, V24
Narrow picture - V22, V23, V24, V25, V26
Vert. off freq. - V18, V19
Horiz. off freq. - V18, V21, V22

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The video and sound IF circuits may be aligned with interconnecting cable between the RF-IF chassis and sweep chassis removed. Alignment of these circuits with this cable removed eliminates the high voltage shock hazard.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This disables the local oscillator and reduces the possibility of erroneous indications.
Connect a 100MMF capacitor across the vertical input terminals of the oscilloscope.
Use only enough sweep generator output to provide useable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	43.5MC (10MC Swp)	42.0MC 45.0MC	Any	Vert. Amp. thru 33KΩ to point (A). Low side to chassis.	A1, A2	Detune 2nd. IF transformer by connecting an alligator clip to pin 5 (plate) of 6CB6 (V4). Adjust for response similar to Fig. 1. Attenuate sweep generator output to maintain 1 volt peak to peak on scope. Remove alligator clip from pin 5 of V4.
2.	"	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis.	"	42.0MC 44.9MC	"	"	A3, A4	Connect the negative lead of a 3 volt bias battery to the ungrounded side of C43. Connect the positive lead to chassis. Adjust for response similar to fig. 2.
3.	"	High side to pin 1 (grid) of 6CB6 (V3). Low side to chassis.	Not used	41.25MC (Unmod)	"	Use VTVM. DC probe thru 33KΩ to point (A). Common to chassis.	A5	Disconnect bias battery. Adjust for MINIMUM deflection.
4.	"	"	"	47.25MC (Unmod)	"	"	A6	"
5.	"	"	43.5MC (10MC Swp)	42.5MC 44.5MC	"	Vert. Amp. thru 33KΩ to point (A). Low side to chassis.	A7, A8	Reconnect bias battery as in step 2. Adjust for response similar to Fig. 3.
6.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	Not used	39.75MC (Unmod)	"	Use VTVM. DC probe thru 33KΩ to point (A). Common to chassis.	A9	Disconnect bias battery. Adjust for MINIMUM deflection.
7.	"	"	43.5MC (10MC Swp)	41.25MC 42.5MC 44.5MC 47.25MC	"	Vert. Amp. thru 33KΩ to point (A). Low side to chassis.	A10, A11	Reconnect bias battery as in step 2. Adjust for response similar to Fig. 4.
8.	"	"	"	39.75MC 41.25MC 41.75MC 42.5MC 44.5MC 45.75MC 47.25MC	"	"		Check for response curve similar to Fig. 5. If necessary, retouch A1 thru A4, A7, A8, A10 and A11 to obtain desired response. To observe the 39.75MC and 47.25MC markers disconnect the bias battery, increase scope gain and sweep generator output. If necessary, repeat steps 4 and 6.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A12, A13, A14, A15	Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point (C). Common to chassis.	A16	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

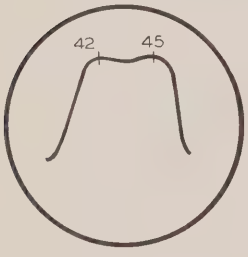


FIG. 1

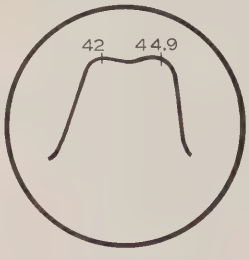


FIG. 2

FIG. 3

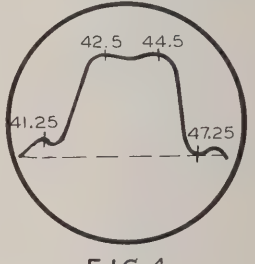


FIG. 4

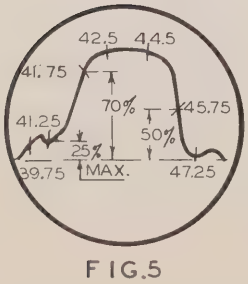


FIG. 5

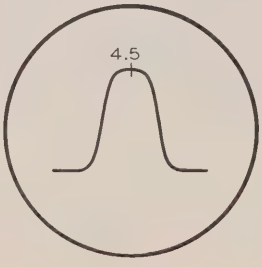


FIG. 6

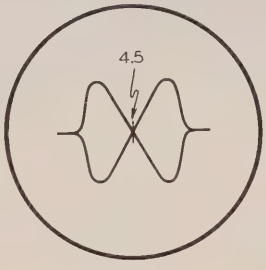


FIG. 7

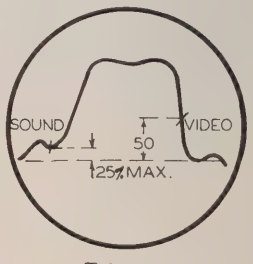


FIG. 8

PROPERTY OF
L. F. GRAVENSHIP
3924 MEADE ST.
DENVER, COLORADO

ALIGNMENT INSTRUCTIONS (cont)

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.01MFD	High side to point A Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. amp. to point B . Low side to chassis.	A12, A13, A14, A15	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 6.
10.	"	"	"	"	"	Vert. amp. to point C . Low side to	A16	Reconnect stabilizing capacitor C2. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 7. SLIGHTLY retouch A15 for maximum amplitude and straightness of crossover lines.

OSCILLATOR ALIGNMENT

Install the interconnecting cable between the RF-IF chassis and sweep chassis.
Remove the dummy converter tube and replace the original 6J6 in its socket.
Leave the bias battery connected as in step 2 of video IF alignment.
The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

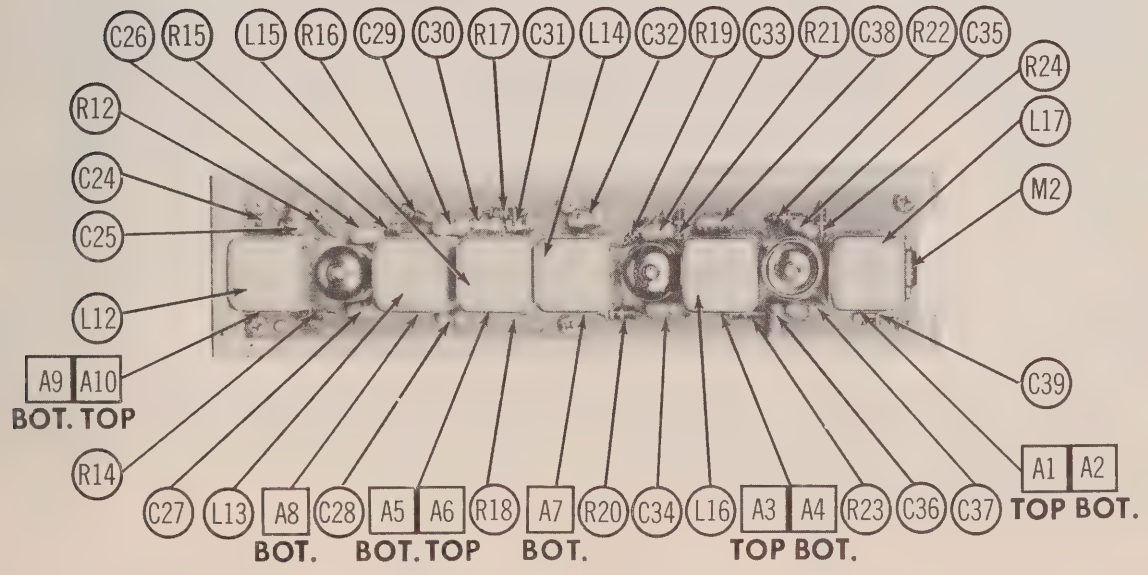
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. amp. thru 33KΩ to point A . Low side to chassis.	A17	Adjust to place sound marker in trap notch as in Fig. 8. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A18	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A19	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A20	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A21	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A22	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A23	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A24	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A25	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A26	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A27	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A28	

RF AND MIXER ALIGNMENT

The RF and Mixer portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

4.5MC TRAP ALIGNMENT

Tune the set on and tune in a TV station. Adjust A29 for minimum 4.5MC beat interference in the picture.

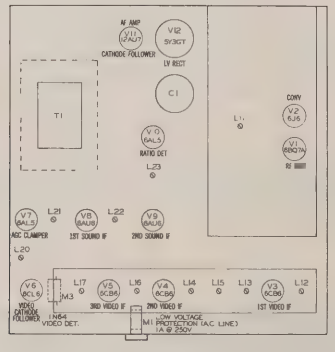


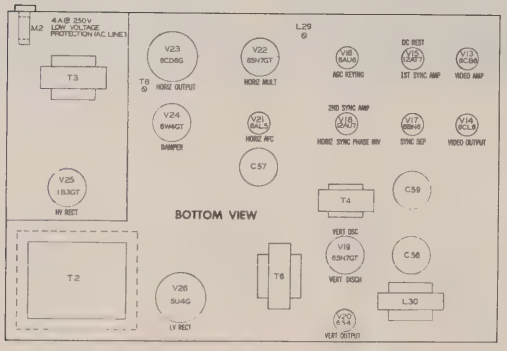
VIDEO IF STRIP

RESISTANCE MEASUREMENTS

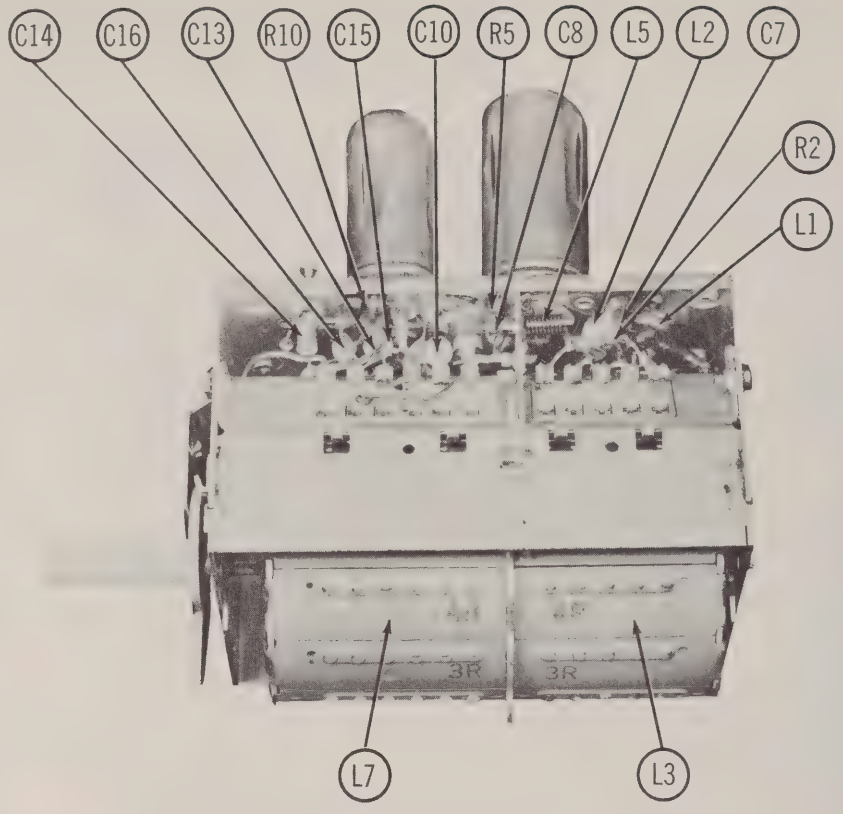
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	800KΩ	0Ω	.1Ω	0Ω	†5.6KΩ	140KΩ	INF	
V 2	6J6	■4.8KΩ	■15.1KΩ	.1Ω	0Ω	235KΩ	10KΩ	0Ω		
V 3	6CB6	75KΩ	82Ω	0Ω	.1Ω	■1.3KΩ	■3.5KΩ	0Ω		
V 4	6CB6	92KΩ	47Ω	0Ω	.1Ω	■1.3KΩ	■1.3KΩ	0Ω		
V 5	6CB6	10KΩ	82Ω	.1Ω	0Ω	■1.3KΩ	■1.3KΩ	0Ω		
V 6	6CL6	91Ω	5.6KΩ	■106Ω	0Ω	.1Ω	■106Ω	0Ω	■106Ω	5.6KΩ
V 7	6AL5	INF	800KΩ	.1Ω	0Ω	3.3KΩ	0Ω	INF		
V 8	6AU6	2.5Ω	0Ω	.1Ω	0Ω	■1.1KΩ	■1.1KΩ	100Ω		
V 9	6AU6	56KΩ	0Ω	.1Ω	0Ω	■1.1KΩ	■80KΩ	0Ω		
V 10	6AL5	600KΩ	600KΩ	.1Ω	0Ω	10KΩ	0Ω	10KΩ		
V 11	12AU7	■3.4KΩ	■100KΩ	22KΩ	0Ω	0Ω	■100KΩ	480KΩ	12KΩ	.1Ω
V 12	5Y3GT	INF	50KΩ	INF	60Ω	INF	5.6Ω	INF	50KΩ	
V 13	6CB6	91Ω	600Ω	.1Ω	0Ω	†7.3KΩ	† 5.1KΩ	0Ω		
V 14	6CL6	91Ω	560KΩ	†5.1KΩ	.1Ω	0Ω	†3.1KΩ	0Ω	†5.1KΩ	560KΩ
V 15	12AT7	0Ω	0Ω	1Meg	0Ω	0Ω	†15.1KΩ	190Ω	680Ω	.1Ω
V 16	6AU6	†45KΩ	†4.5KΩ	0Ω	.1Ω	500KΩ	†25KΩ	†4.5KΩ		
V 17	6BN6	0Ω	1Meg	.1Ω	0Ω	†52KΩ	0Ω	†23KΩ		
V 18	12AU7	†14.1KΩ	1Meg	1.5KΩ	0Ω	0Ω	†8.5KΩ	1Meg	3.9KΩ	.1Ω
V 19	6SN7GT	1.4Meg	†56KΩ	200Ω	1.4Meg	▲3.5Meg	200Ω	0Ω	.1Ω	
V 20	6S4	10KΩ	2.5KΩ	2.2Meg	.1Ω	0Ω	2.2Meg	1.2KΩ	INF	▲6KΩ
V 21	6AL5	2.3Meg	2.3Meg	.1Ω	0Ω	10KΩ	0Ω	10KΩ		
V 22	6SN7GT	180KΩ	†139KΩ	2KΩ	2.7Meg	†5.7KΩ	2KΩ	0Ω	.1Ω	
V 23	6CD6G	†30KΩ	.1Ω	150Ω	470KΩ	470KΩ	†18KΩ	0Ω	†30KΩ	TOP CAP ▲10Ω
V 24	6W4GT	▲15Ω	INF	290KΩ	INF	† 140Ω	INF	290KΩ	290KΩ	
V 25	1B3GT	PINS 1 - 8 HAVE INF RESISTANCE								TOP CAP ▲350Ω
V 26	5U4G	▲220KΩ	15KΩ	INF	27Ω	INF	25Ω	INF	15KΩ	
V 27	27EP4	0Ω	1Meg	PIN 10 ▲5KΩ	PIN 11 ▲220KΩ	PIN 12 .1Ω				

† MEASURED FROM PIN 8 OF V26
■ MEASURED FROM PIN 2 OF V12
▲ MEASURED FROM PIN 3 OF V24

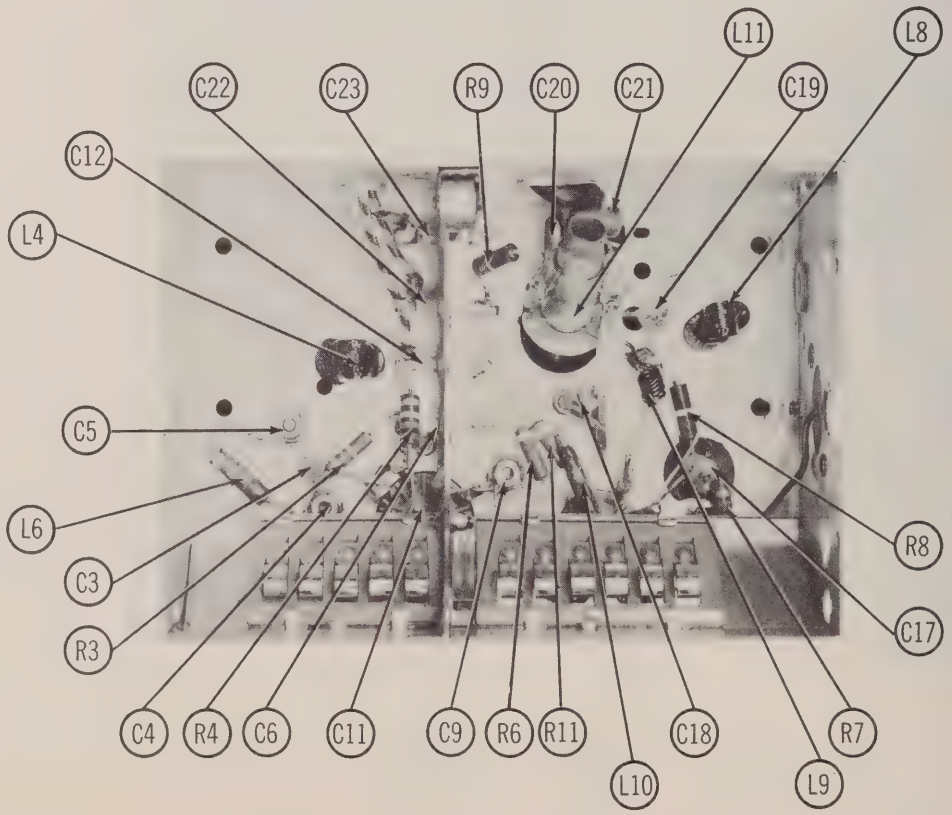




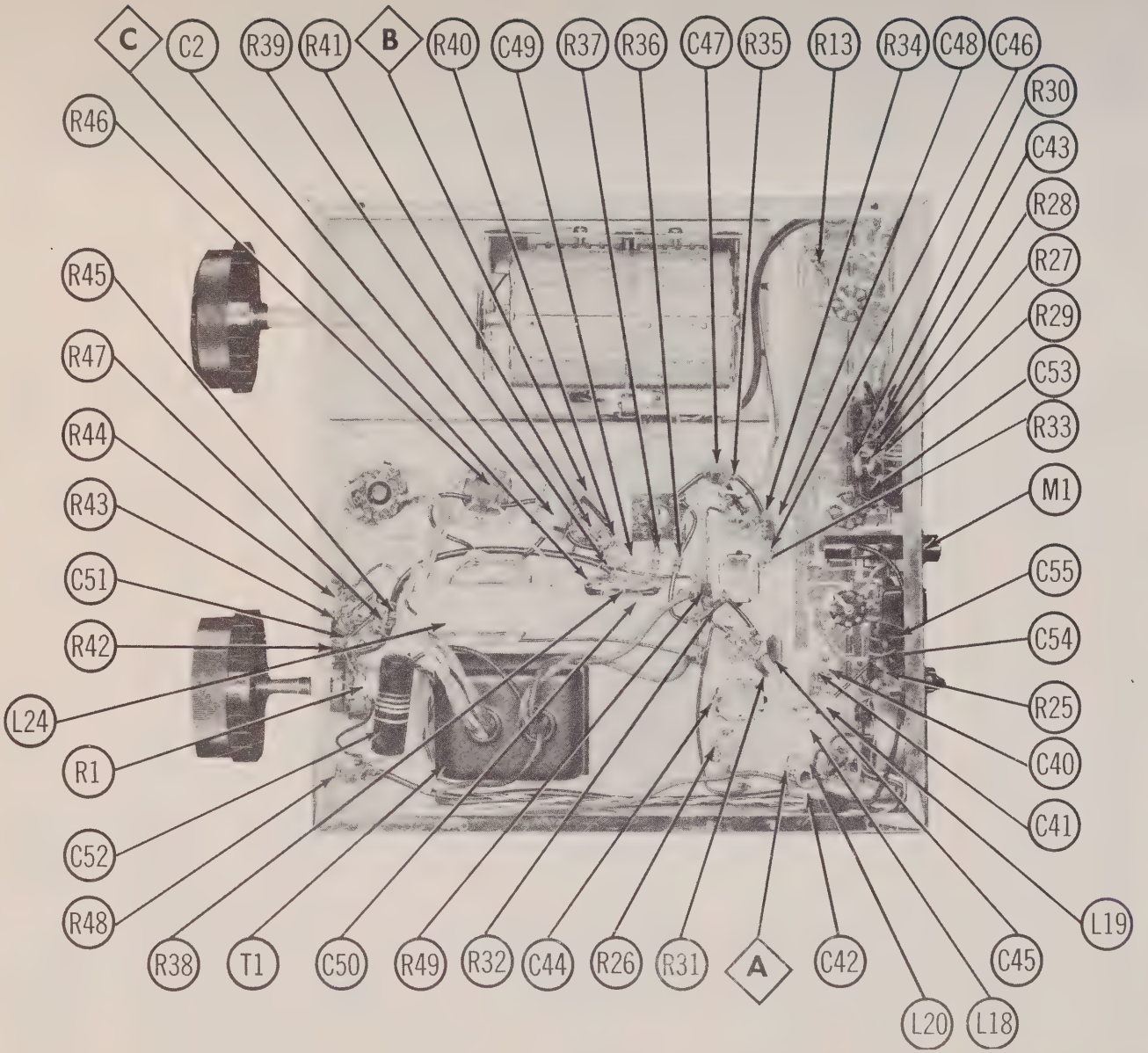
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



PROPERTY OF
L. F. ELMENHORST
3001 MILOE ST.
DENVER, COLORADO

RF-IF CHASSIS-BOTTOM VIEW

MODEL C210 (Ch. C210P & C210V)

CRAFTSMEN

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V23, V24 and V26. Check adjustments B2 and B3. Check T5, T7A, R121, R122, R120 and other associated components.

DRIVE LINES

Check adjustments B2 and B3. Check by substitution V23 and V24. Check R117, C91 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V23 and V24. Check horizontal output and damper stages for component failure or change of value, especially T5 and T7A.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V22, V23 and V24. Check C86 for open. Check other associated components.

XMAS TREE EFFECT

Check by substitution V22, V23 and V24. Check L29, C88, C89 and other associated components. Check T5 and T7A for internal arcing.

VERTICAL

LOSS OF SWEEP

Check by substitution V19 and V20. Check waveform W12.

If Satisfactory	If Unsatisfactory
Check T6, T7B, C78 and other associated components.	Check C77, C73, C74, R93, R55, R92, T4 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V19 and V20. Check vertical size and vertical linearity controls for proper operation. Check T6, T7B and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V19 and V20. Check R93, R55, R92, C77 and other associated components.

COMPRESSED AT TOP

Check by substitution V19 and V20. Check R93, R96, R56, C59A and other associated components.

FOLDS

Check by substitution V19 and V20. Check C76, R94, T6, T7B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V15, V17 and V18. Check C67, C69, C70, R71, R77, R79, R83 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V19. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check T4, R90, C74, C72, and other associated components.	Check vertical integrator network for component failure or change of value. Check video IF alignment for overloading.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V18, V21 and V22. Check waveform W17.

If Satisfactory	If Unsatisfactory
Check components associated with V22 for failure or change of value.	Check horizontal AFC network and other associated components.

HORIZONTAL BENDING

Check by substitution V15, V16, V17, V18, V21 and V22. Check video IF alignment.

VIDEO

LOSS OF VIDEO

Check by substitution V6, V13 and V14. Check C63, C64, R65, R64, R61, L27, L28, picture tube and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check video IF alignment.

POOR CONTRAST

Check by substitution V6, V13 and V14. Check picture tube. Check video crystal detector network and other associated components.

NEGATIVE PICTURE

Check by substitution V6, V13 and V14. Check AGC network. Check picture tube and other associated components.

SMEAR

Check by substitution V6, V13 and V14. Check L25, L26, L27, L28 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6, V13 and V14. for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9, V10 and V11. Check external audio amplifier.

If Satisfactory	If Unsatisfactory
Check ratio detector, audio IF components and alignment.	Check if external audio amplifier is connected and in proper operation.

BUZZ

Adjust tuner fine tuning for best sound and picture. Adjust A16 for minimum buzz. If still unsatisfactory check audio IF alignment.

DISTROTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light in RF-IF chassis and Sweep chassis, check AC interlock asembly, M1, switch on volume control and T1 in RF-IF chassis. If filaments fail to light in Sweep chassis, check relay, M2, AC interlock assembly and T2. If filaments light, check V26 and V12. Check B+ filter and decoupling network in Sweep chassis.

SMALL AND/OR DIM PICTURE

Check by substitution V26 and V12. Check B+ filter and decoupling network in RF-IF chassis and Sweep chasssis.

PROPERTY OF

PARTS LIST AND DESCRIPTIONS

RF IF CHASSIS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		CRAFTSMEN PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Converter	6J6	6J6	7BF	
V3	1st Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Cathode - Follower	6CL6	6CL6	6CL6	
V7	AGC Clamper	6AL5	6AL5	6BT	
V8	1st Sound IF Amp.	6AU6	6AU6	7BK	
V9	2nd Sound IF Amp.	6AU6	6AU6	7BK	
V10	Ratio Detector	6AL5	6AL5	6BT	
V11	AF Amplifier-Cathode Follow	12AU7	12AU7	9A	
V12	LV Rectifier	5Y3G	5Y3G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CRAFTSMEN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■100	200	18S043			B025		FP432.9		
B	▬100	200				BR2025		TC59		
C	▲20	200								
C2	5	25		PRS150/4		BR550		TC30	TVA-1203	
C3	3			SI3NP0	TCZ-3	Z007	NP0K-030	ZT-5533	5TCCB-V33	
C4	3-9				829-10					
C5	3-9				829-10					
C6	800			EF-001	MFT-1000				503C-D1	
C7	3			SI3NP0	TCZ-3	Z007	NP0K-030	ZT-5533	5TCCB-V33	
C8	800			EF-001	MFT-1000				503C-D1	
C9	.5-3				829-3		3115-01-0R5	CT565A		
C10	120			BPD-00012	D6-121	G044	GP2K-121	UC-5312	5GA-T12	
C11	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C12	800			EF-001	MFT-1000				503C-D1	
C13	47			BPD-000047	D6-471	G033	801-470	UC-5447	5GA-Q47	
C14	.5-3				829-3		3115-01-0R5	CT565A		
C15	10			SI10NP0	TCZ-10	Z018	NP0K-100	ZT-541	5TCC-Q1	
C16	5									
C17	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C18	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C19	6.8			SI6.8NP0	TCZ-6.8	Z013	NP0K-6R8	ZT-5568	5TCCB-V68	
C20	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C21	82				TCN-82	TN20	N750K-820			
C22	800			EF-001	MFT-1000				503C-D1	
C23	800			EF-001	MFT-1000				503C-D1	
C24	9					Z017	NP0K-090			
C25	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C26	470			SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C27	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C28	470			SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C29	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C30	12									
C31	5									
C32	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C33	470			SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C34	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C35	680			SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	Note 1
C36	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C37	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C38	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C39	4			SI4NP0	TCZ-040	Z009	NP0K-040			
C40	5.6									Note 2
C41	5.6									Note 2
C42	47	500		1469-00005		22R5Q47		MCE225	MS-45	
C43	.22	400		P488-22		CUB4P22		PT4022	4TM-P22	
C44	1.5			SI1.5NP0	TCZ-1.5	TZ04	NP0K-1R5	ZT-5515	5TCCB-V15	
C45	5000		18X701	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C46	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C47	5000		18X701	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C48	5000		18X701	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C49	330	500		1469-00035		5R5T33				
C50	820	500				5R5T82				
C51	.022	400		P488-022	DF-203	CUB4S22	817-02	PT4122	4TM-S22	
C52	.22	400		P488-22		CUB4P22		PT4022	4TM-P22	
C53	.22	400		P488-22		CUB4P22		PT4022	4TM-P22	
C54	.01	600		689ZX-01		CUB6S1		PT611	6TM-S1	
C55	.01	600		689ZX-01		CUB6S1		PT611	6TM-S1	

Note 1. Some models use 470MMF in this application.
Note 2. When C40 is 10MMF, C41 is not used.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Craftsmen PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	10KΩ		23S739				UF14R	Contrast - Panel
B	500KΩ						UR55A	Volume - Rear
C	Switch						US-26	Attach to R1B

PROPERTY OF
L. F. BLANKENSHIP
3921 MEADE ST.
DENVER COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CRAFTSMEN PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R1	15kΩ	½		BTS-15k	
R3	47kΩ	½		BTS-47k	
R4	220kΩ	½		BTS-220k	
R5	330kΩ	½		BTS-330k	
R6	470Ω	½		BTS-470	
R7	15kΩ	½		BTS-15k	
R8	330kΩ	½		BTS-330k	
R9	15kΩ	½		BTS-15k	
R10	10kΩ	½		BTS-10k	
R11	4700Ω	½		BTS-4700	
R12	10kΩ	½		BTS-10k	
R13	6800Ω	½		BTS-6800	
R14	82Ω	½		BTS-82	Note 1
R15	2200Ω	½		BTS-2200	
R16	1200Ω	½		BTS-1200	
R17	2200Ω	½		BTS-2200	
R18	248Ω 5%	½		BTS-248 5%	
R19	22kΩ	½		BTS-22k	
R20	47Ω	½		BTS-47	
R21	1200Ω	½		BTS-1200	Note 2
R22	10kΩ	½		BTS-10k	
R23	82Ω	½		BTS-82	
R24	1200Ω	½		BTS-1200	Note 2
R25	5800Ω	½		BTS-5800	
R26	2200Ω	½		BTS-2200	
R27	4.7Meg	½		BTS-4.7Meg	
R28	470kΩ	½		BTS-470k	
R29	330kΩ	½		BTS-330k	
R30	68kΩ	½		BTS-68k	
R31	100Ω	½		BTS-100	
R32	1000Ω	½		BTS-1000	
R33	56kΩ	½		BTS-56k	
R34	33kΩ	½		BTS-33k	
R35	100kΩ	½		BTS-100k	
R36	1000Ω	½		BTS-1000	
R37	270Ω	½		BTS-270	
R38	100kΩ	½		BTS-100k	
R39	12kΩ	½		BTS-12k	
R40	10kΩ 5%	½		BTS-10k 5%	Note 3
R41	10kΩ 5%	½		BTS-10k 5%	Note 3
R42	10kΩ	½		BTS-10k	
R43	470kΩ	½		BTS-470k	
R44	2200Ω	½		BTS-2200	
R45	100kΩ	½		BTS-100k	
R46	3300Ω	½		BTS-3300	
R47	22kΩ	½		BTS-22k	
R48	1 Meg	½		BTS-1 Meg	
R49	3.3 Ω	½			

Note 1. Some models may use a 47Ω resistor in this application.
Note 2. Some models may use a 1000Ω resistor in this application.
Note 3. Some models may use a 100kΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA CRAFTSMEN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC	370VCT @ .65A	5VAC @ 2A	198225						
		SEC. 3	SEC. 4	SEC. 5						
		6.3VAC @ 4.5A								

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CRAFTSMEN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	IF Trap	0Ω						Wound on 68MMF Cap.
L2	IF Trap	0Ω						Wound on 68MMF Cap.
L3	Ant. Coils	0Ω CT	0Ω					
L4	Fil. Choke	0Ω						
L5	Neutr. Coil	0Ω						
L6	IF Trap	.9Ω						
L7	RF, Mixer Grid & Osc. Coils	0Ω						
L8	Fil. Choke	0Ω						
L9	RF Choke	0Ω						
L10	Feedback Coil	1.4Ω						
L11	Conv. Plate	.1Ω						
L12	1st. Video IF Grid	4Ω(tap ④)	2.2Ω					Includes trap - Note 1
L13	1st. Video IF Plate	1.5Ω						Note 1
L14	2nd. Video IF Grid	1.1Ω						Note 1
L15A	41.25MC Trap	1.4Ω						Note 1
B	47.25MC Trap	1Ω						Note 1
L16	3rd. Video IF	1.7Ω	1.2Ω					Note 1
L17	4th. Video IF	2.6Ω	2.4Ω					Note 1
L18	Series Peaking Coil	7Ω			19-3075	TV-121	6172	60 Microhenries, wound on 15kΩ resistor
L19	Shunt Peaking Coil	16Ω			19-4412		4646	410 Microhenries, wound on 10kΩ resistor
L20	4.5MC Trap	2.6Ω		5A027	20-1004	TV-151	1469	
L21	1st. Sound IF	2.5Ω		5A025	17-1021 ■	TV-113 ■	6203 ■	
L22	2nd. Sound IF	1.4Ω	1.4Ω	5A026	17-1021	TV-113	6203	
L23	Ratio Det.	3.7Ω	1.8ΩCT	5C208	17-1033	TV-110 *	1468	Tertiary winding - .1Ω

Note 1. Video IF strip replaceable as a whole unit (part #25B096).
■ Drill mounting hole.
* Use one winding only.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 Cycles	REPLACEMENT DATA CRAFTSMEN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L24	.083ADC	106Ω	3.3 Hy.	198416	C2303		C-9X	C5024	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA CRAFTSMEN PART No. FUSE	HOLDER	LITTELFUSE PART No. FUSE	HOLDER	BUSS PART No. FUSE	HOLDER
M1	3AG	1A 250V			312001 (3AG 1A)	34001	AGC 1	HXP

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA CRAFTSMEN PART No.	SYLVANIA PART No.	FEDERAL PART No.	NOTES
M2	1N64		1N133 or 1N60	1N60 or 1N64A	Video Detector

MISCELLANEOUS

ITEM No.	PART NAME	CRAFTSMEN PART No.	NOTES
M3	Tuner	25B059	VHF-Cascode
	Knob	6X017	On-off-volume
	Knob	6X018	Contrast
	Knob	6X019	Channel selector
	Knob	6X020	Fine tuning
	Video IF Strip	25B081	Printed circuit

SWEEP CHASSIS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA CRAFTSMEN PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V13	Video Amplifier	6CB6	6CB6	7CM	
V14	Video Output	6CL6	6CL6	6CL	
V15	DC Restorer-1st Sync Amplifier	12AT7	12AT7	9A	
V16	AGC Keying	6AU8	6AU8	7BK	
V17	Sync Separator	6BN6	6BN6	7DF	
V18	2nd Sync Amp-Sync Phase Inverter	12AU7	12AU7	9A	
V19	Vert Osc.-Vert. Discharge	6SN7GT	6SN7GT	8BD	
V20	Vert. Output	6B4	6B4	9AC	
V21	Horiz. AFC	6AL5	6AL5	6BT	
V22	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V23	Horiz. Output	6CD6G	6CD6G	6BT	
V24	Damper	6W4GT	6W4GT	4CG	
V25	HV Rectifier	1B3GT	1B3GT	2C	
V26	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA CRAFTSMEN PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V27	21EP4	21EP4	21EP4	21EP4		12D	① Circuit changes necessary.
				21YP4		12D	
	24CP4	24CP4	24CP4	24CP4		12N	
		24CP4A		24CP4A		12N	
		24TP4		24XP4 ①			

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CRAFTSMEN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C56A	▲70	450	188940			D123		FP377	TVL-4774	
B	▲70	450						TC77		
C57A	■20	450	188941			C100		FP444.8	TVA-1711	
B	▲60	250						TC72	TVL-2708	
C	▲30	450						TC72		
C58	30	450		PR3450/30		BR3045		TC77	TVA-1711	
C59A	▲100	50	188042	AFB3-156		C112		FP316	TVL-2708	
B	▲10	450						TC72		
C60	50	35		PR525/50		BR502		TC29	TVA-1206	
C61	5	25		PR350/5		BR150		TC30	TVA-1302	
C62	5	25		PR350/4		BR150		TC30	TVA-1203	
C63	.22	400		P488-22		CUB4P22		PT4022	4TM-P22	
C64	.15	400		P488-15		CUB4P15		PT4015	4TM-P15	
C65	1000	500		1465-001	D6-102	1W5D1	GP2L-102	MC255	1FM-21	
C66	.47	200		P288-47		CUB2P47		PT4047	2TM-P47	
C67	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C68	220	500		1465-00025	D6-221	5W5T22	GP2K-221	MC240	1FM-325	
C69	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C70	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C71A	.0032							PT6223		
B	.0047		≈18X706	≈PA-110	≈PC-100	≈1157M1	≈1405-01	PT6247	≈V-1	
C	.0047							PT6247		
C72	4700	500		1464-001		1R5D47		MC6465	MG-25	
C73	.047	400		P488-047	DF-503	CUB4S47 PM4S50		PT4147	4TM-S47	
C74	.056	100				CUB6S47		PT6147	6TM-S47	
C75	.047	600		P688-047	DF-503	CUB4S47		PT6147	6TM-S47	
C76	.047	400		P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C77	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C78	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C79	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C80	.01	600		P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C81	1000	500		1468-001	D6-102	1W5D1	GP2L-102	MC255	1FM-21	
C82	1000	500		1468-001	D6-102	1W5D1	GP2L-102	MC255	1FM-21	
C83	1000	500		1468-001	D6-103	1W5D1	GP2L-102	MC255	1FM-21	
C84	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C85	.0047	600		P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C86	.1	200		P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C87	.033	400		P488-033		CUB4S33		PT6133		
C88	4700	500		1465-005		1R5D47		MC6465	MG-25	
C89	390	500		1469-0004		5R5T39		MCE243	MG-34	
C90	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	Note 3
C91	680	500				1R5T68				

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CRAFTSMEN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C92	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C93	1000	1000		1487L-HV-001		1R5KV-102	1R5KV-102	MCK230	10kA D1	Note 4
C94	.1	400		P488-1		CUB6P1		PT601	6TM-P1	
C95	.047	600		P688-047		CUB6S47		PT6147	6TM-S47	
C96	500	30000	18X621		TV8-503	MMU30U5				
C97	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C98	75	2000								Note 4
C99	.01	600		68W2X-01		CUB6S1		PT611	6TM-S1	
C100	.01	600		68W2X-01		CUB6S1		PT611	6TM-S1	

Note 3. Some models use .047MFD in this application.
Note 4. Value may vary from 75MMF to 82MMF.
Note 5. Not used with 70 degree deflection picture tubes.
* Items C78A, C78B, C78C, R89A, R89B, R89C are combined in one unit

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CRAFTSMEN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R50A	500kΩ	½	238740	Qu-133	A47-500K-B	B-59	U-50	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R50A
R51A	1Meg	½	235721	Qu-137	A47-1Meg-S	B-69	U-56	Vert. Hold - Note
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R51A
R52A	50kΩ	½	238730	Qu-123	A47-50K-S	B-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R52A
R53	500Ω	½						Aux. contrast- wire wound
R54A	50kΩ	½	238741	Qu-123	A47-50K-S	AB-31	SU-35	AGC
B	Shaft		Not Req.	Not Req.	FS3-1/4	AK-1	Not Req.	Attach to R54A
R55A	2Meg	½	238723	Qu-139	A47-2Meg-S	AB-75	SU-56	Vert. Size
B	Shaft		Not Req.	Not Req.	FS3-1/4	AK-1	Not Req.	Attach to R55A
R56A	5000Ω	½	238724	Qu-114	A47-5000-S	AB-10	SU-14	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FS3-1/4	AK-1	Not Req.	Attach to R56A

Note: Some models may use an alternate control part #238721.

RESISTORS

ITEM No	RATING OHMS	RATING WATT	REPLACEMENT DATA CRAFTSMEN PART No.	IRC PART No.	NOTES
R57	910 5%	1			
R58	270Ω	½		BTS-270	
R59	10kΩ	½		BTS-10K	
R60	100kΩ	½		BTA-100K	
R61	2200Ω 5%	1		BTA-2200 5%	
R62	560kΩ	½		BTA-560K	
R63	910 5%	1			
R64	1500Ω 5%	2			
R65	1500Ω 5%	2			
R66	1 Meg	½		BTS-1 Meg	
R67	39kΩ	½		BTS-39K	
R68	100Ω	½		BTS-100	
R69	680Ω	½		BTS-680	
R70	39kΩ	½		BTS-39k	
R71	10kΩ	½		BTS-10K	
R72	180kΩ	½		BTS-180K	
R73	39kΩ	½		BTS-39K	
R74	39kΩ	½		BTS-39K	
R75	39kΩ	1		BTA-39K	
R76	56kΩ	½		BTS-56K	
R77	470kΩ	½		BTS-470K	
R78	1 Meg	½		BTS-1 Meg	
R79	47kΩ	½		BTS-47K	
R80	18kΩ	½		BTS-18K	
R81	1 Meg	½		BTS-1 Meg	
R82	1500Ω	½		BTS-1500	
R83	10kΩ	½		BTA-10K	
R84	3900Ω	1		BTA-3900	
R85	1 Meg	½		BTS-1 Meg	
R86	3900Ω 5%	1		BTS-3900 5%	
R87	4700Ω 5%	1		BTS-4700 5%	
R88	22kΩ	½		BTS-22K	
R89A	22kΩ	½		BTS-22K	
B	8200Ω	½	≈18X706	BTS-8200	
C	8200Ω	½		BTS-8200	
R90	1 Meg	½		BTS-1 Meg	
R91	39kΩ	½		BTS-39K	
R92	56kΩ	½		BTS-56k	
R93	1.5Meg	½		BTS-1.5Meg	
R94	10kΩ	½		BTS-10K	
R95	2.2Meg	½		BTS-2.2Meg	
R96	1000Ω	½		BTS-1000	
R97	560Ω	½		BTS-560	
R98	560Ω	½		BTS-560	
R99	2200Ω	½		BTS-2200	
R100	2.2Meg	½		BTS-2.2Meg	
R101	56kΩ	½		BTS-56K	
R102	100kΩ	½		BTS-100K	
R103	100kΩ 5%	½		BTS-100K 5%	
R104	100kΩ 5%	½		BTS-100K 5%	
R105	2.2 Meg	½		BTS-2.2Meg	
R106	27kΩ	½		BTS-27K	
R107	6800Ω	2		BTB-6800	
R108	6800Ω	2		BTS-6800	
R109	470kΩ	½		BTS-470K	
R110	39kΩ	½		BTS-39K	
R111	2000Ω 5%	1		BTS-2000 5%	
R112	5600Ω 5%	1		BTA-5600 5%	
R113	5000Ω	5		1 3/4A-5000	
R114	150kΩ	½		BTS-150K	
R115	100kΩ 5%	½		BTS-100K 5%	
R116	39kΩ	½		BTS-39K	
R117	10kΩ	½		BTS-10K	
R118	100Ω	½		BTS-100	
R119	470kΩ	½		BTS-470K	
R120	150Ω	2			
R121	12kΩ	2		BTB-12K	
R122	18kΩ	2		BTB-18K	
R123	5000Ω	5		1 3/4A-5000	
R124	10000Ω	2		BTB-10000	
R125	5.6Ω	1			
R126	1 Meg	½		BTA-1 Meg	
R127	10kΩ	10		1 3/4A-10K	
R128	5000Ω	20		2D-5000	

* Items R89A, R89B, R89C, C71A, C71B, C71C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA CRAFTSMEN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T2	117VAC @1.75A	670VCT @.200ADC	5VAC @3A	198224	P-8345②	P-3970 ①	R-39BC			26R21 ↓
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC @ 8.6A									

*① Tape 6.3V @ 2.7A winding.
② Tape 6.3V @ 1.2A winding.

TRANSFORMER FILAMENT ISOLATION

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA CRAFTSMEN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T3	6.3VAC @1.76A	6.3VAC @ 1.2A		198226	P-8181① ②	P-3097 ①	F50X		F5530	

① Drill one new mounting hole.
② Transformer has 117V primary, connect to AC line.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA						
		CRAFTSMEN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T4	Vert. Osc. Trans.	19S602	A-8125 ①	A-3003 ①	A-97X ①	209T1 ①	B6702 ①	24A87 ①
T5	Horiz.Output Trans.	19S020			D-50 * & WC-11②	235T1 * & 214R1 ②		FLY-16*& WC-20 ②
T6	Vert.Output Trans.	19S021	A-8141	A-3039	A-104X	226T1	Z1806	26S54
T7A B	Yoke-Horiz. (15MH) Vert. (35MH)	5B817		MDF-90③	Y-50-1	219D1 ③		Y-14
T8	Horiz.Linearity (1.1-6.5 MH)	5B818	WC-8	MWC-6④	WC-12 ⑤	213R1		WC-18④

① Drill one new mounting hole.
② Drill new mounting holes.
③ Use original yoke network and leads.
④ Enlarge mounting hole.
⑤ Connect to coded blue and green terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordarson Replacement Connections
	6			9	9		9
	5			7	7		7
	4			5	5		5
	3			T	T		T
	1			1	1		1
	A			To Sec . of WC-11	To Sec. of 214R1		To Sec. of WC-20
	G			Conn.to Sec. of WC-11	Conn to Sec. of 214R1		To Sec. of WC-20
Connect Width Coil Across →				Pri of WC-11 to terms. #1 & #3	Pri of 214R1 to terms #1 & #3		Pri of WC-20 to terms.#1 & #3
Special Notes →				⑥	⑥		②⑥

⑥ Connect primary of replacement width coil across terminals #1 and #3. Connect secondary to AFC and AGC. If picture is out of phase, reverse secondary.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CRAFTSMEN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L25	Shunt Peaking Coil	5.5Ω			19-3075 ▲		6172 ▲	76 Microhenries, wound on 22KΩ resistor
L26	Series Peaking Coil	6.2Ω			19-3093	TV-181	6177	88 Microhenries
L27	Series Peaking Coil	8.5Ω			19-3160 †		4644	156 Microhenries, wound on 5.6KΩ resistor
L28	Shunt Peaking Coil	12Ω			19-3180	TV-184	6180	186 Microhenries
L29	Horiz.Osc. Coil	80Ω		5B816	19-1576	TV-163	6210	

▲ Parallel with a 22KΩ resistor.
† Parallel with a 5.6KΩ resistor.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	CRAFTSMEN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L30	.200ADC	119Ω	6 Hy.	19S415	C-2334 ①		C-14X①		20C55 ②

① Drill one new mounting hole.
② Drill new mounting holes.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			CRAFTSMEN PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M4	3AG	4A 250V			312004	341001	MTH4	HKP

MISCELLANEOUS

ITEM No.	PART NAME	CRAFTSMEN PART No.	NOTES
M5	Relay	7-A4-BA	Power switch (Ch. 210P)
M6	Focus magnet	16X409	Includes centering device
M7	Ion trap	16X407	
B2	Trimmer cap.		Horiz. Drive (420-1100MMF)

TROUBLE SHOOTING AIDS (cont)

DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V22, V23, V24, V25 and V26. Check waveform W19.

If Satisfactory	If Unsatisfactory
Check T5, T7A, C94, C95, C97, C92, C62, R121, T3, T8 and other associated components.	Check C90, C89, C88, R116, R115, R112, L29, R111 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V23, V24 and V26. Check R122, R121, C92, T5 and T7A. Check B2 and B3. Check picture tube and other associated components.

BLOOMING

Check by substitution V23, V24, V25 and V26. Check T5, T7A, C62, R120 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V3, V4, V5, V6, V13, and V14. Check V1 and V2 in tuner. Check video IF components and alignment.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

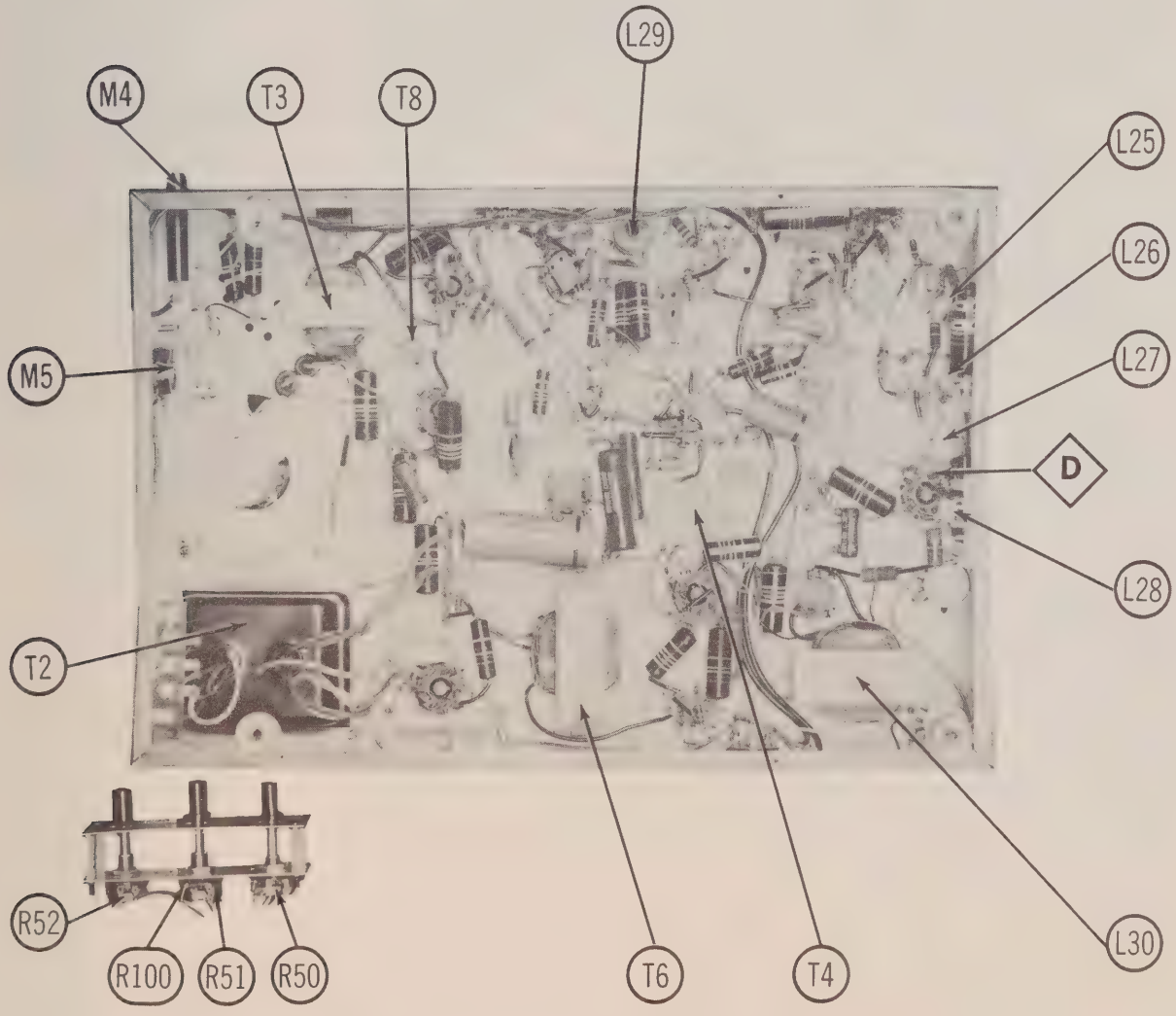
KEYSTONE EFFECT

Check T7 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



SWEEP CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENT

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the chassis to the right of the channel selector shaft.

SERVICE ADJUSTMENT LOCATION

See Tube Placement Chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal oscillator slug (L29) until picture synchronizes horizontally. (For location see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L23) located on top of chassis. (See tube placement chart).

FUSES

Two fuses are used. One fuse used in Ch. C210V for LV power supply and the other used in Ch. 210P for LV power supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position and adjust the horizontal oscillator slug (B1) until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B2) counter clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the horizontal linearity coil slug (B3) for a picture that is symmetrical from left to right.

AGC ADJUSTMENT

Connect the high side of the vertical amplifier of an oscilloscope to pin 1 (grid) of 6CB6 (V13).

Connect the low side to chassis.

Carefully adjust the AGC control (R54A) so that no compression of the sync pusles or video occurs.

AUXILIARY CONTRAST ADJUSTMENT

Connect the high side of the vertical amplifier of scope to point ◇D◇ . Low side to chassis. Adjust auxiliary contrast control (R53) so that waveform measures 100 volts peak to peak on scope. See Fig. 9.

FIG. 9

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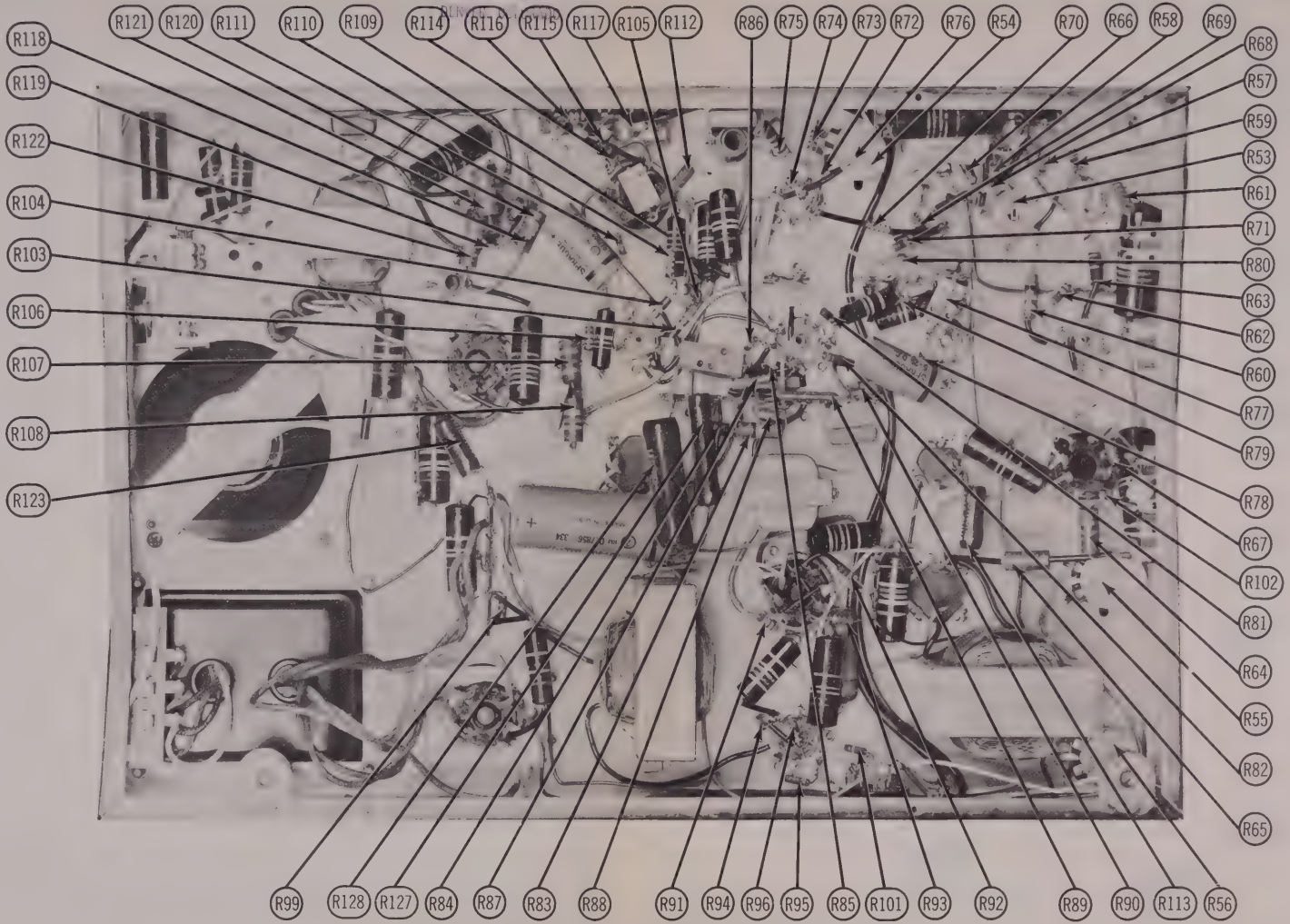

SWEEP CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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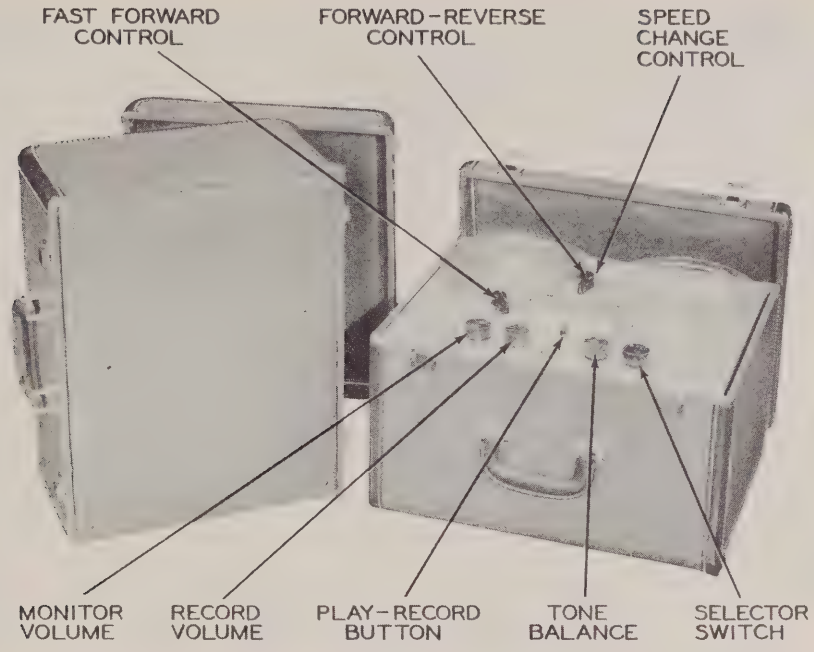

Figure 1

GENERAL INFORMATION

The Crestwood Series 400 Tape Recorder consists of Models 401 and 402. Model 401 contains the tape transport mechanism, pre-amplifier, and power supply, housed in a vinyl covered case. Model 402 contains the power amplifier and speaker and its case matches that of Model 401.

This recorder is designed to record and play back two tracks of material on standard width recording tape, doubling the playing time with no loss of frequency response or quality. Recordings can be made from a radio, television receiver or phonograph (using a crystal or magnetic cartridge), in addition to those made directly from the microphone.

The Crestwood has two tape speeds, 7 1/2" and 3 3/4" per second. Using both tracks, the recording time is as follows:

Size Reel	Speed 3 3/4"	Speed 7 1/2"
5"	1 hour	1/2 hour
7"	2 hours	1 hour

The 400 Series is designed to operate on 60 cycle, 105-120 volts, AC supply only.

CAUTION: Severe Damage Will Result If Connection Is Made To A Direct Current (DC) Line.

Manufactured by:

Crestwood Recorder Division
of
Daystrom Electric Corp.
837 Main Street
Poughkeepsie, New York

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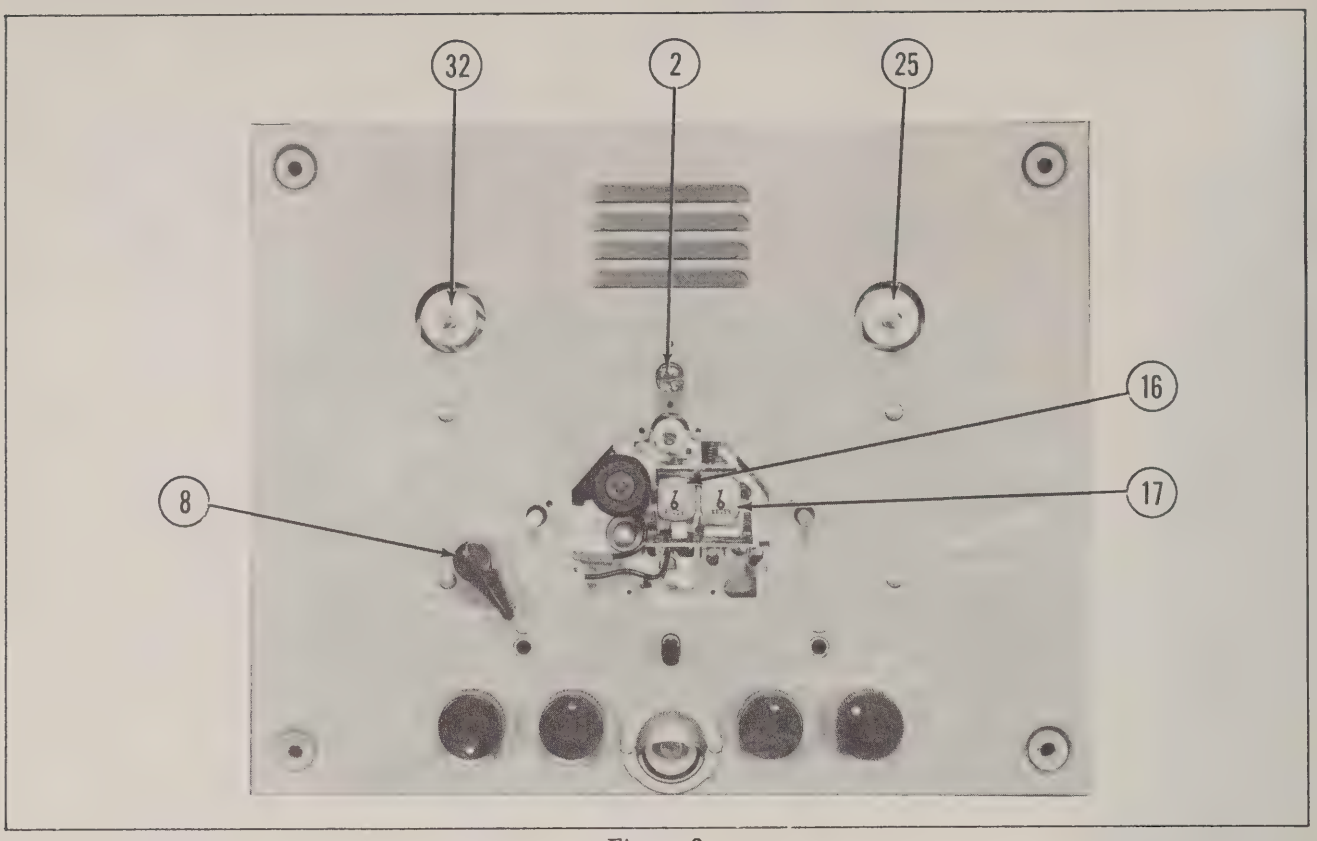

Figure 2

SPECIFICATIONS OF MODEL 401

Size-Portable Unit: 9 1/2" x 13 1/2" x 16".

Weight: 24 3/4 lbs.

Case: Heavy vinyl covering with saddle stitched leather binding.

Tape Speed: 7 1/2" per second and 3 3/4" per second.

Tracks: Dual.

Maximum Reel Size: 7".

Tape Wind: "A".

Track Selection: Manual Turnover.

Fast Rewind Speed: 20 times faster than speed setting.

Fast Forward Speed: 20 times faster than speed setting.

Frequency Response: Maximum deviation + or - 2db 30 to 13,000 cycles at 7 1/2" per second.

Distortion: Less Than 2%.

Wow And Flutter: 0.3% or lower at 7 1/2" per second.

Bias And Erase Frequency: 75 K.C.

Inputs: Microphone-panel jack. Radio-TV-jack panel, rear of unit. Phonograph-jack panel, rear of unit.

Outputs: Monitor-panel jack. To power amplifier-jack at rear of unit.

SPECIFICATIONS OF MODEL 402

Size-Portable Unit: 9 1/2" x 13 1/2" x 16".

Weight: 21 1/2 lbs.

Input: High Impedance (Jack connection).

Power Output: 10 Watts.

Signal To Noise Ratio: 65db or better.

Distortion: Less than 2%.

Frequency Response: + or - 1db 20 to 20,000 cycles.

OPERATING INSTRUCTIONS

Preparing The Crestwood For Recording-

1. Plug the AC power cord socket into the AC receptacle on the rear panel of the recorder case and insert the AC power cord plug into a convenient 105-120 volt, 60 cycle AC outlet.

2. Connect the 401 recorder to the 402 speaker and power amplifier by using the Audio Cable supplied with the 402. The output jack on the rear panel of the 401 and the input jack on the side panel of the 402 are for this purpose.

Threading The Tape-

1. Place a reel of tape on the right hand spindle so that the tape will lead off in a clockwise direction.

NOTE: This recorder uses Type "A" wound tape, i.e. the dull or magnetic coated side faces

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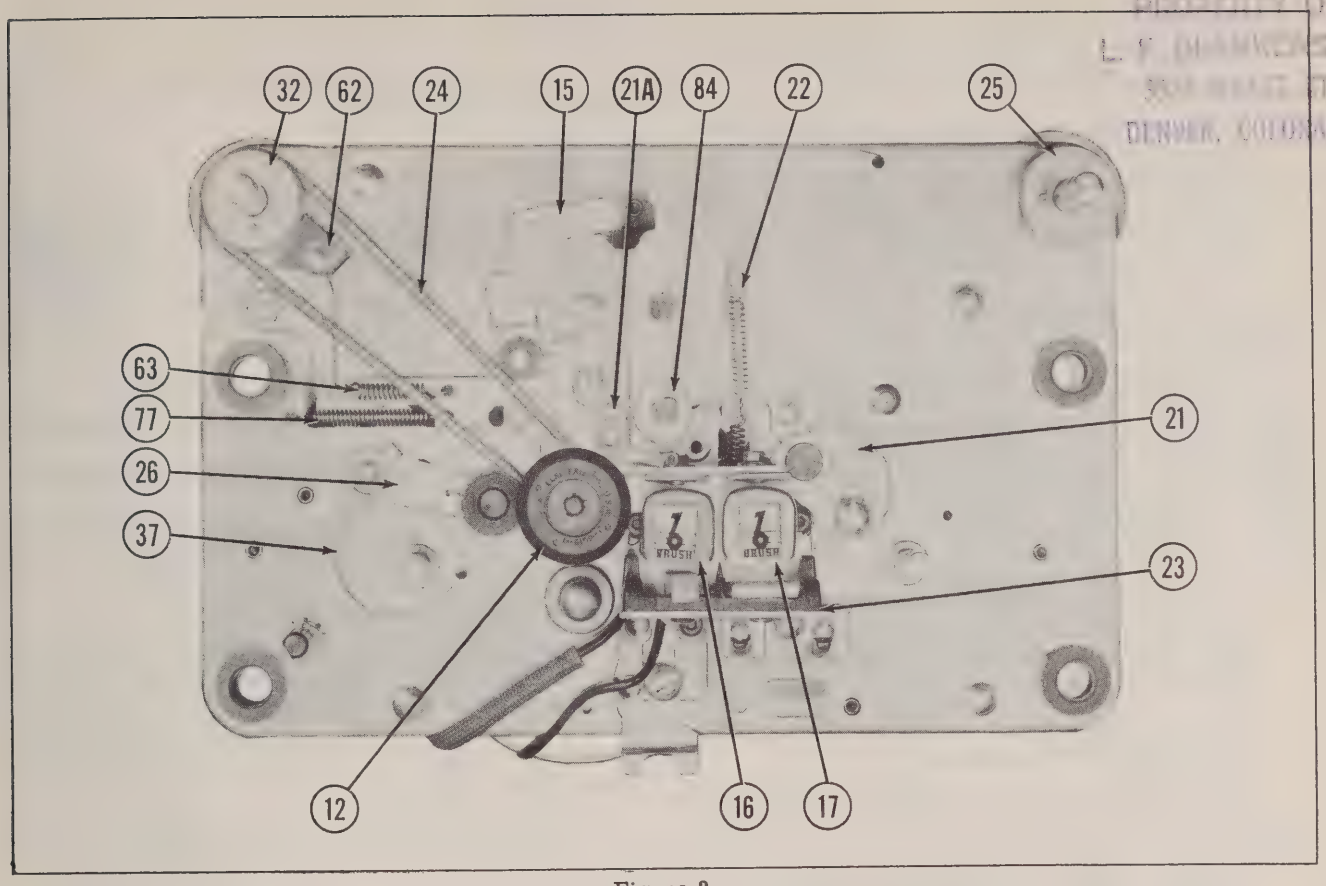

Figure 3

inward on the reel. If the tape used is Type "B" (coated side facing outward) the recording will be made at a very low sound level and the playback will be almost inaudible.

2. Place an empty reel on the left hand spindle. Be sure that both reels are fully seated and engaged with the drive pins on the spindles.

3. Unwind about 12 inches of tape. Hold a section of tape straight with both hands and insert the tape into the tape slot. Feed the free end of the tape into one of the three radial slots in the hub of the empty reel. Turn the reel in a clockwise direction until the tape is secured and all slack is taken up between reels.

To Record From Microphone-

1. Insert the microphone plug into the jack marked "Mic". on the top panel.

2. Turn "Monitor Volume" knob slightly to the right to turn on the amplifier. Allow a few seconds for the amplifier tubes to warm up before starting to record.

3. Turn the "Selector Switch" knob to "Mic.".

4. Hold the microphone approximately one foot from lips. Adjust "Record Volume" control until the recording indicator almost closes at the loudest sound. The unit is now set to record.

5. Hold "Press To Record" button down and turn the forward-reverse knob (1) to "Forward". The "Press to Record" button will now stay depressed in record position.

NOTE: Be certain fast forward control knob (8) is in "Normal" position. If not, the mechanism will not operate.

To Record From Phonograph-

Crestwood 401 Recorders have a phono circuit designed to match the output of modern magnetic phono pickups. Crystal pickups should be plugged into the microphone jack. (Shield to plug shield.) The phono circuit matches General Electric and Audak pickups. The Pickering cartridge needs a resistor of approximately 15,000 ohms connected across the phono plug to provide better match.

1. Connect the output of the phono pre-amplifier to the phono jack on the 401 panel. The connecting cable must be well shielded and short as practicable. (Sleeve of cable plug must be connected to shield of cable.)

2. Turn "Monitor Volume" knob slightly to the right to turn on the amplifier. Allow a few seconds for the amplifier tubes to warm up before starting to record.

3. Turn "Selector Switch" to "Phono".

4. Start record playing and adjust "Record Volume" control until the record indicator almost closes on loudest peaks.

5. To monitor recording, set "Monitor Volume" control for desired listening level.

6. Hold "Press To Record" button down and turn forward-reverse knob (1) to "Forward".

The "Press To Record" button will now stay depressed in record position. Start record to be recorded at desired starting point.

7. Model 401 incorporates a "Tone Balance Circuit". Listening to the monitor speaker will enable you to adjust the "Tone Balance" control to obtain the most pleasing reproduction. The tape recording will match the tone balance selected.

To Record From Radio Or TV-

Recordings can be made from a radio or television receiver by placing the microphone near the speaker; however, this type of recording may not be satisfactory as other sounds may be picked up by the microphone which as a result will be recorded on the tape. A higher quality recording can be made by using a shielded cable equipped with a phono plug, connected as follows:

1. Insert phono plug into Radio-TV jack. Connect other end of shielded cable across output of radio receiver or across voice coil connections on radio or TV speaker.

2. Turn "Monitor Volume" knob slightly to the right to turn on the amplifier.

3. Turn "Selector Switch" to "Radio" position.

4. Start radio or TV playing and adjust "Record Volume" control until recording indicator almost closes on loudest peaks.

5. Hold "Press To Record" button down and turn forward-reverse lever (1) to "Forward".

6. The "Tone Balance" control is automatically disconnected when unit is in record radio position.

To Stop Tape Movement-

1. Tape movement may be stopped at any time by turning forward-reverse knob (1) to "Stop".

NOTE: When the recorder is not in use, forward-reverse knob (1) should be left in the "Stop" position.

Dual Track Operation-

NOTE: Recordings are made on half the width of the tape at one time. Since it is impossible to edit and splice one "track" without affecting the other, recordings which are to be edited should be limited to one track only.

1. After a reel of tape has been recorded, a second track may be recorded on the same reel (without rewinding) by removing the reel from the recorder, turning it over, then placing the full reel on spindle (25) and the empty reel on spindle (32).

2. Thread the tape and proceed with the recording as previously described.

3. After the second track has been recorded, the first track is ready to be played without rewinding, by changing reels as described in Step #1 above.

To Rewind-

To rewind the tape, turn forward-reverse knob (1) to "Rewind" position.

To Play A Recording-

1. The speaker and power amplifier having been connected to the 401, the power cord from the amplifier-speaker is connected to 105-120 volt, 60 cycle AC outlet, and the switch on the "402" amplifier speaker panel turned "On".

2. Turn "Selector Switch" to "Play".

3. Turn forward-reverse knob (1) to "Forward".

4. Adjust "Monitor Volume" to desired level.

5. Adjust "Tone Balance" to produce desired balance of low and high frequency response.

Fast Forward-

Any portion of a recording may be skipped, or any recording on a tape may be located in a few seconds by pivoting the fast forward control knob (8) in a clockwise direction. A few seconds of "Fast Forward" is equivalent to several minutes of playing time. The fast forward knob (8) has three positions:

(a) Normal, at which position it must remain at all times, except for "Fast Forward".

(b) Pause is the mid-position that brakes the reels and stops all tape movement.

(c) Fast Forward is the "Fast Forward" position.

ADJUSTMENTS

Pressure Pad Adjustment-

Check adjustment as follows: Thread a short length of tape between pressure pad and heads but not between capstan shaft and pressure roller (12). Place forward-reverse knob (1) in "Forward" position. Form a loop in the end of the tape in which a spring type scale can be fastened. By pulling on end of spring scale a pressure of from 1 1/4 to 1 1/2 oz. should be required to move tape.

If adjustment is necessary, the pressure can be increased or relieved by loosening screws (23A) that mount the guide assembly (23) to the mechanism, and moving guide assembly (23) toward or away from front of machine. (If sufficient movement of the guide cannot be attained, it may be necessary to remove the guide and increase the length of the slotted holes by filing.)

Record Head (16) Alignment Adjustment-

It is very important that the record head (16) be lined up perfectly with the tape. If it is not, low output, loss of high frequencies or track overlap may result. There are two adjustments to be made. One is the head height. This adjustment is made by turning screws (81) until there is a clearance of 11/64" to

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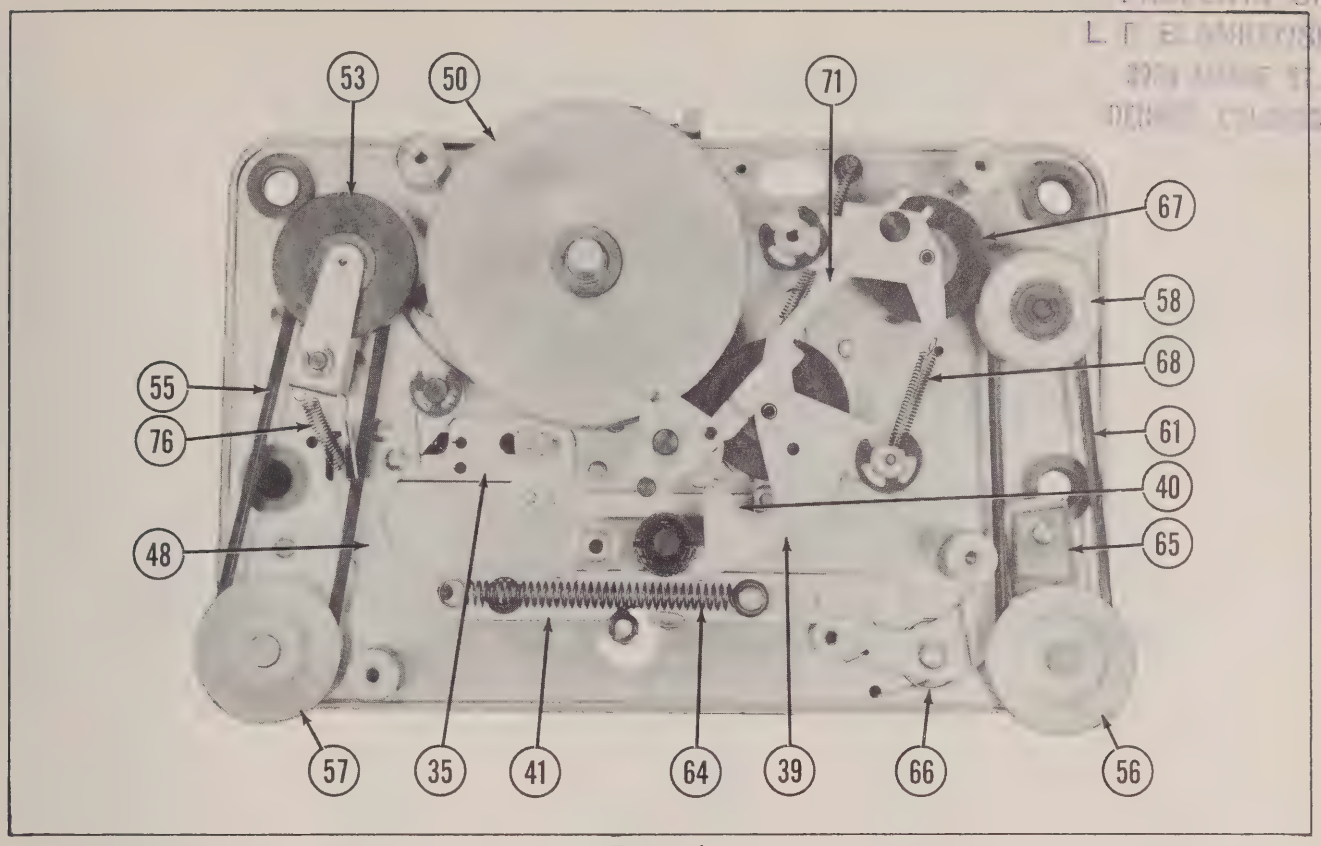

Figure 4

3/16" between the head mounting bracket (20) and the upper mechanism plate (33).

The other adjustment is for output and frequency response. To set this, obtain an alignment tape on which a 3,000 cycle tone has been recorded. If this special tape is not at hand, a fairly satisfactory adjustment can be made by using a tape on which the recording is known to be good. Place the tape on the unit that the head is to be aligned on. Connect an output meter or AC voltmeter across the speaker voice coil. Play the tape and rock the head from side to side, the screw holding the head to the record head bracket (18) will allow you to do this. Notice the variation in the output voltage at the voice coil and tighten the head in the position of highest output. Make sure the head has not moved up or down while rocking it. After setting the height and output, check unit for track overlap. To do this, take a reel of tape that has no recording on it. Make a recording on the unit that the head has been adjusted on. Do not rewind but take the reels off, reverse them and play the other track. There should be no sound heard. If what was recorded is heard backwards then there is track overlap. If this is the case, recheck adjustments.

Rewind Control Arm (71) Adjustment-

Rewind control arm (71) should be adjusted with forward - reverse knob (1) in the "Stop" position. Loosen the control arm cam set screws and position the cam in such a manner that its stud is centered in the slot in the lower mechanism plate (72).

Cam And Bushing Assembly (84) Adjustment-

Set cam and bushing (84) so that its roller rests in the detent of pressure arm (21B) when the mechanism is in "Forward" position. Also adjust arm adjusting plate (21A) so it will clear pressure arm (21B) by 1/16" when in this position.

Switch Cam (85) Adjustment-

Switch cam (85) should be adjusted with speed change knob (2) in the 3 3/4 speed position. Adjust the cam so that its mounting screw contacts and closes the speed equalization switch when in this position.

TROUBLES

Irregular Speed "Wow"-

1. Check capstan and pressure roller (12) for oil or foreign matter. Clean with cloth dipped in Carbon Tetrachloride while running. Check capstan and flywheel assembly (50) for freedom of rotation. If any binding is evident remove same and clean bearing areas on shaft and bearings with clean cloth. (Do not use Carbon Tetrachloride.) Wipe bearing areas with light wax free oil (instrument oil) before replacing.

2. Clean all drive surfaces - motor pulley, idlers and flywheel with Carbon Tetrachloride. If idler pulleys (39 and 40) are not properly engaging flywheel (50) and any indication of scrubbing is evident, replace idler assembly.

3. Check for excessive drag on tape caused by pressure pad on tape guide (23). See "Pressure Pad Adjustment".

4. Check for binds in supply reel shaft (25).
   (a) Drive pulley (56) may be assembled too

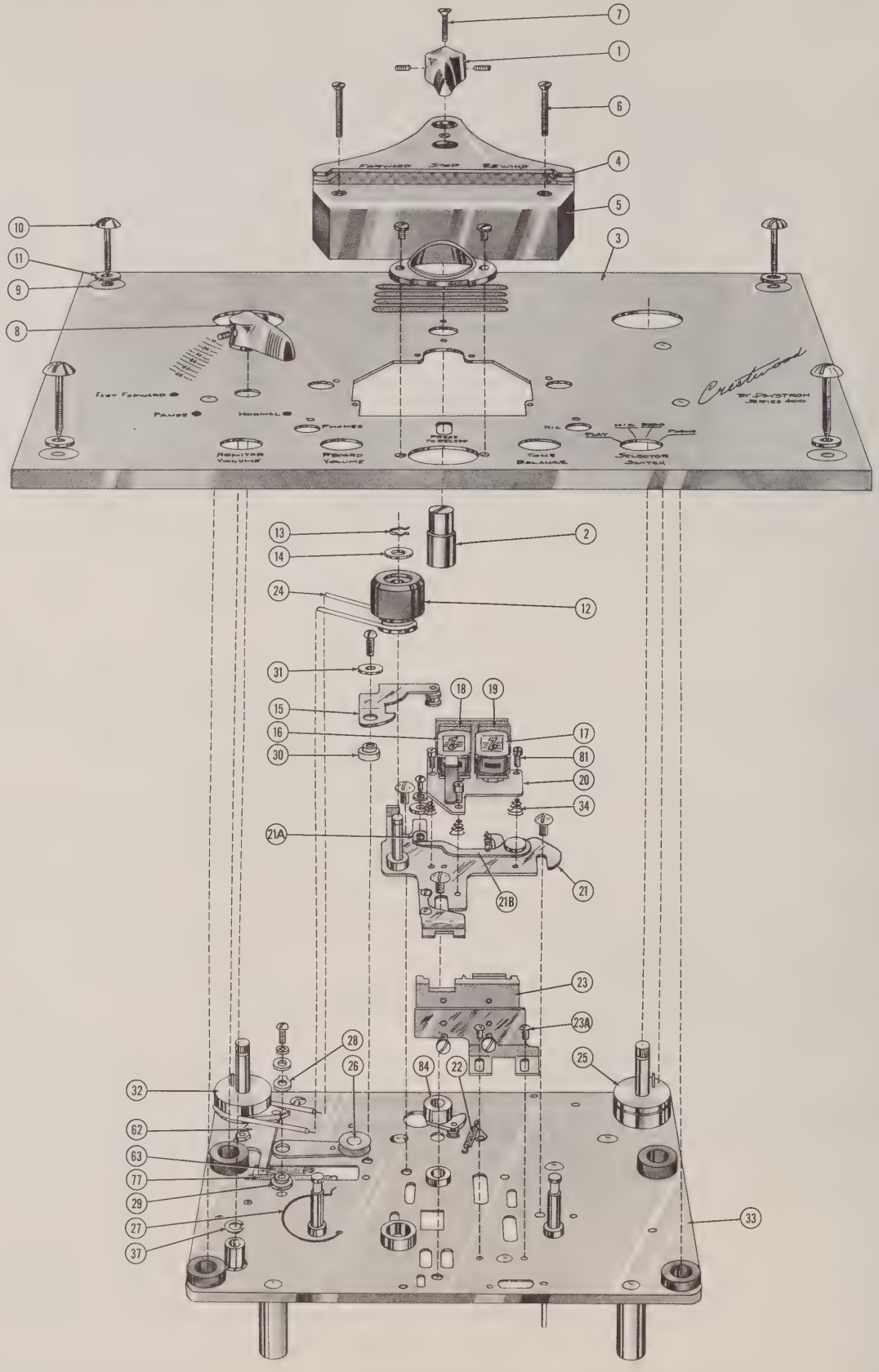

Figure 5A. Exploded View Of Parts Above Baseplate.

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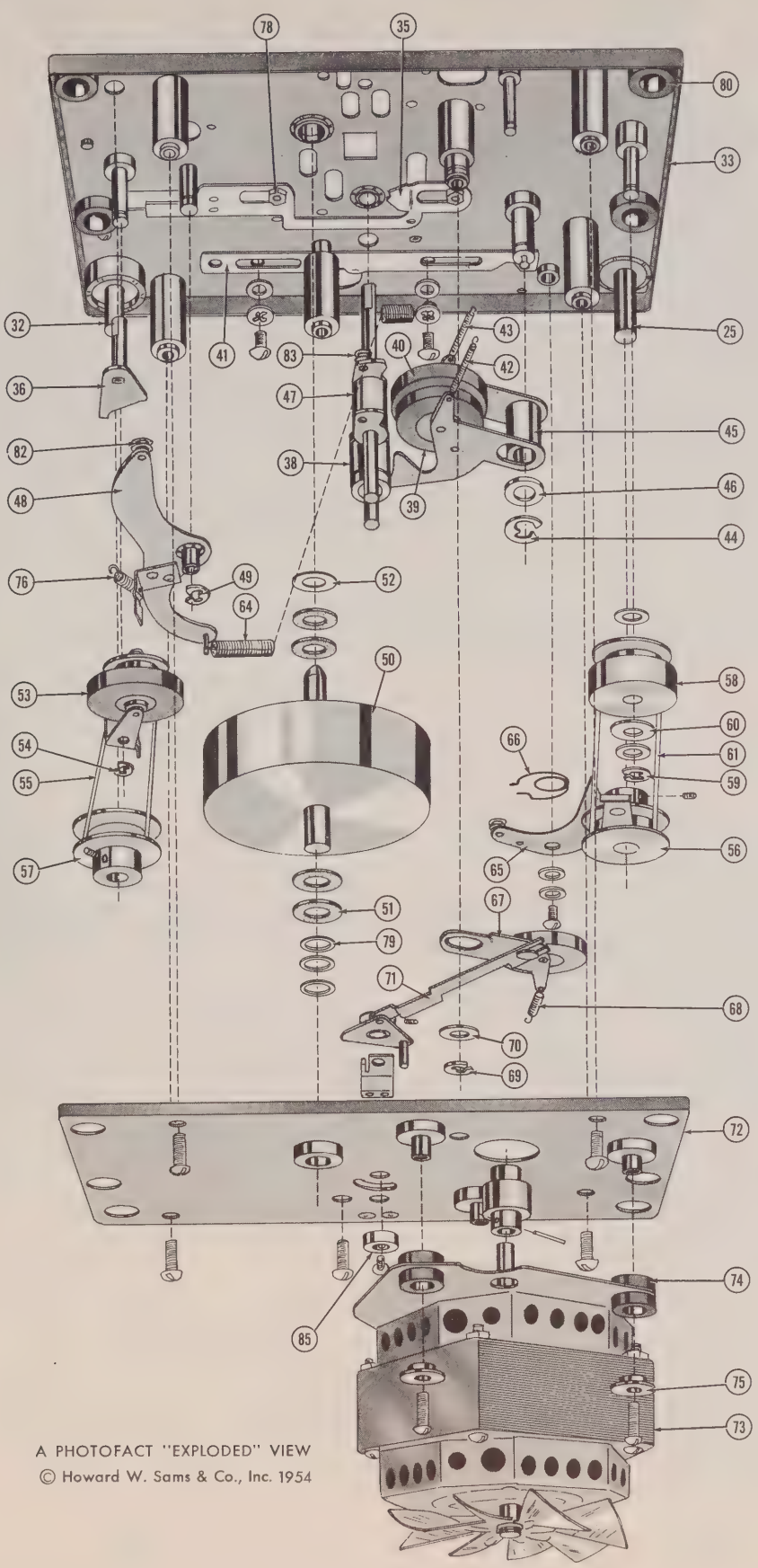


Figure 5B. Exploded View Of Parts Below Baseplate.

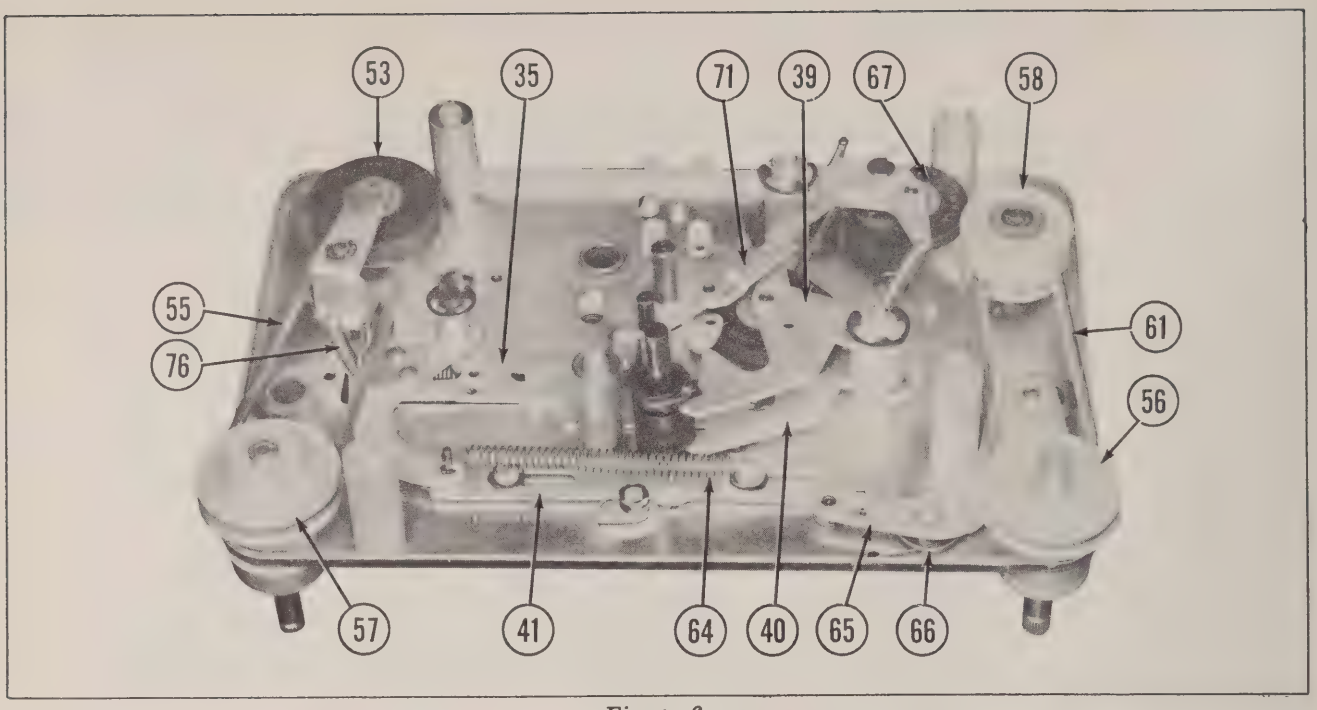


Figure 6

close to top plate. This may be lowered for proper clearance by loosening set screw.

(b) Make sure brake is releasing properly.

(c) Make sure rewind drive pulley (58) is free.

5. Check take-up idler (26) for excessive pressure against nylon take-up belt (24). Idler arm should be free to pivot on mounting screw. Make sure spring (27) is free to allow movement of the idler arm.

Motor Runs But Mechanism Will Not Operate-

1. Fast forward control (8) in "Pause" position. Turn control to "Normal".

2. Take-up belt (24), rewind belt (61) of fast forward drive belt (55) broken or off pulleys. Replace.

Slow Speed-

1. Machine has been exposed to low temperature. Allow machine to warm up to room temperature.

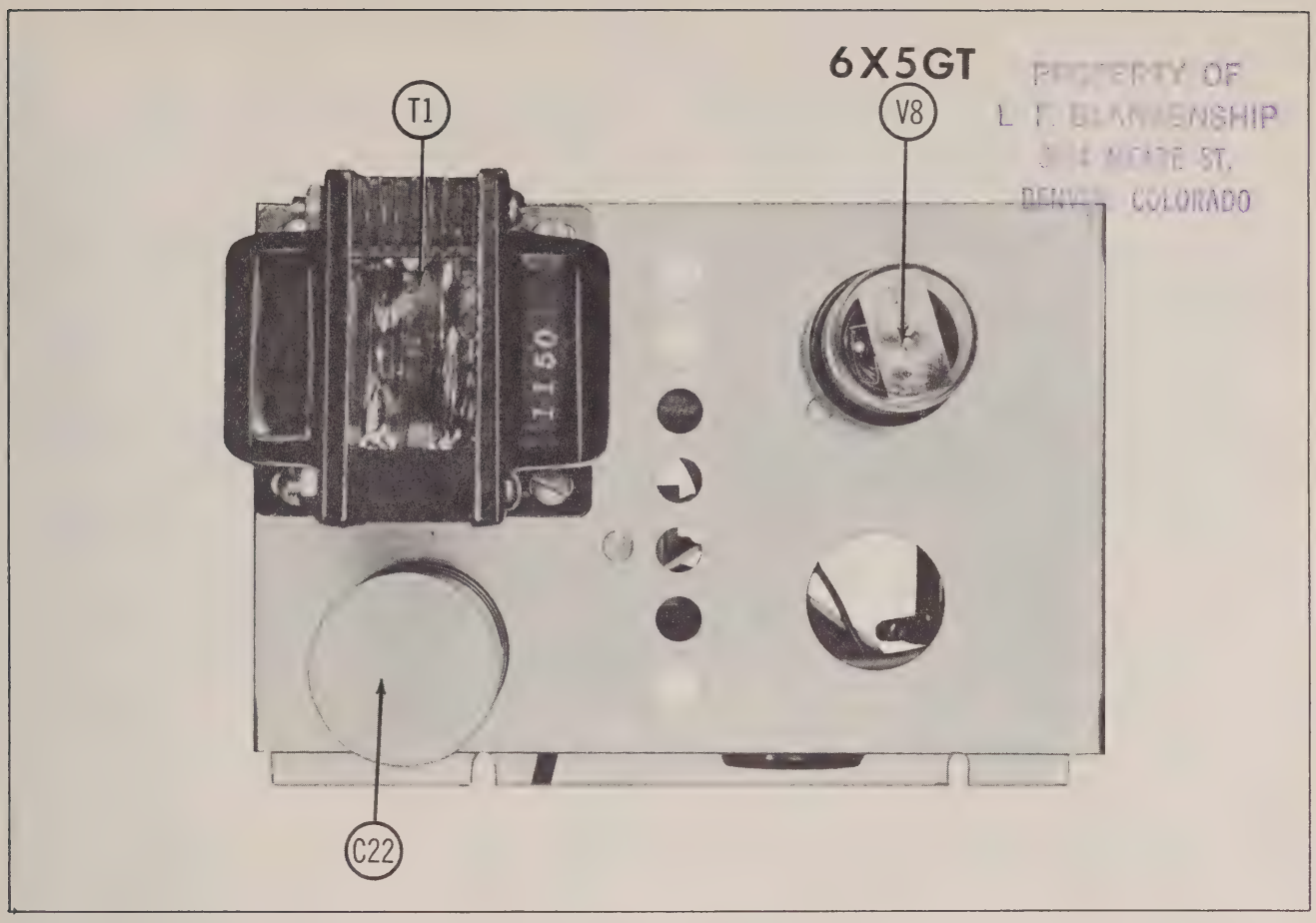
LUBRICATION

All moving parts of this recorder are in either sealed ball bearings, or self-lubricating oilite bearings. Additional lubrication should not be required except in cases of extreme use or replacement of parts. When lubricating, wipe bearing areas with light wax free oil (instrument oil).

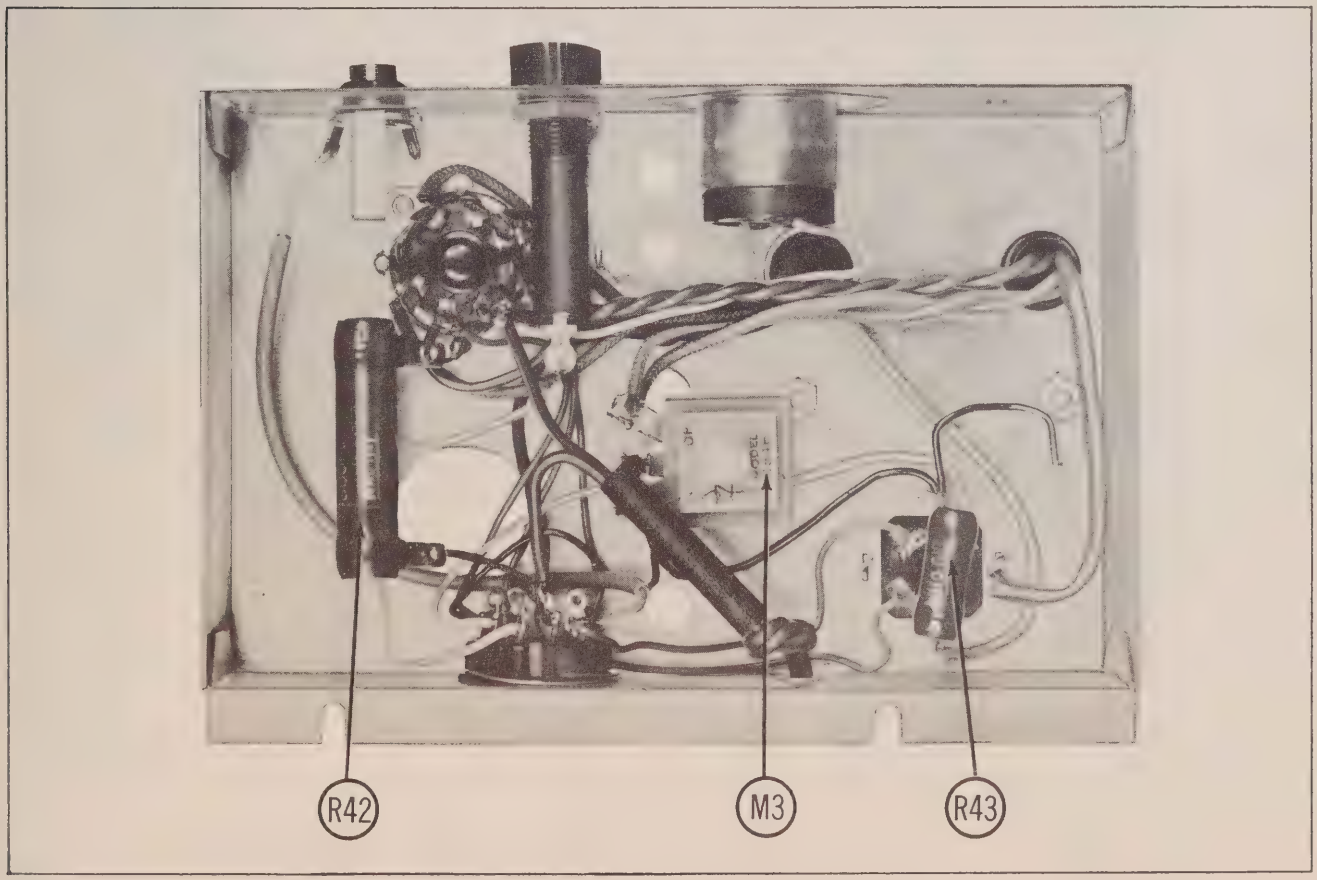
CAUTION: Any excess oil may seep to the outer edges of moving parts and cause slippage in the drive mechanism. Should this occur, wipe off all parts thus affected with a soft cloth and Carbon Tetrachloride.

CLEANING

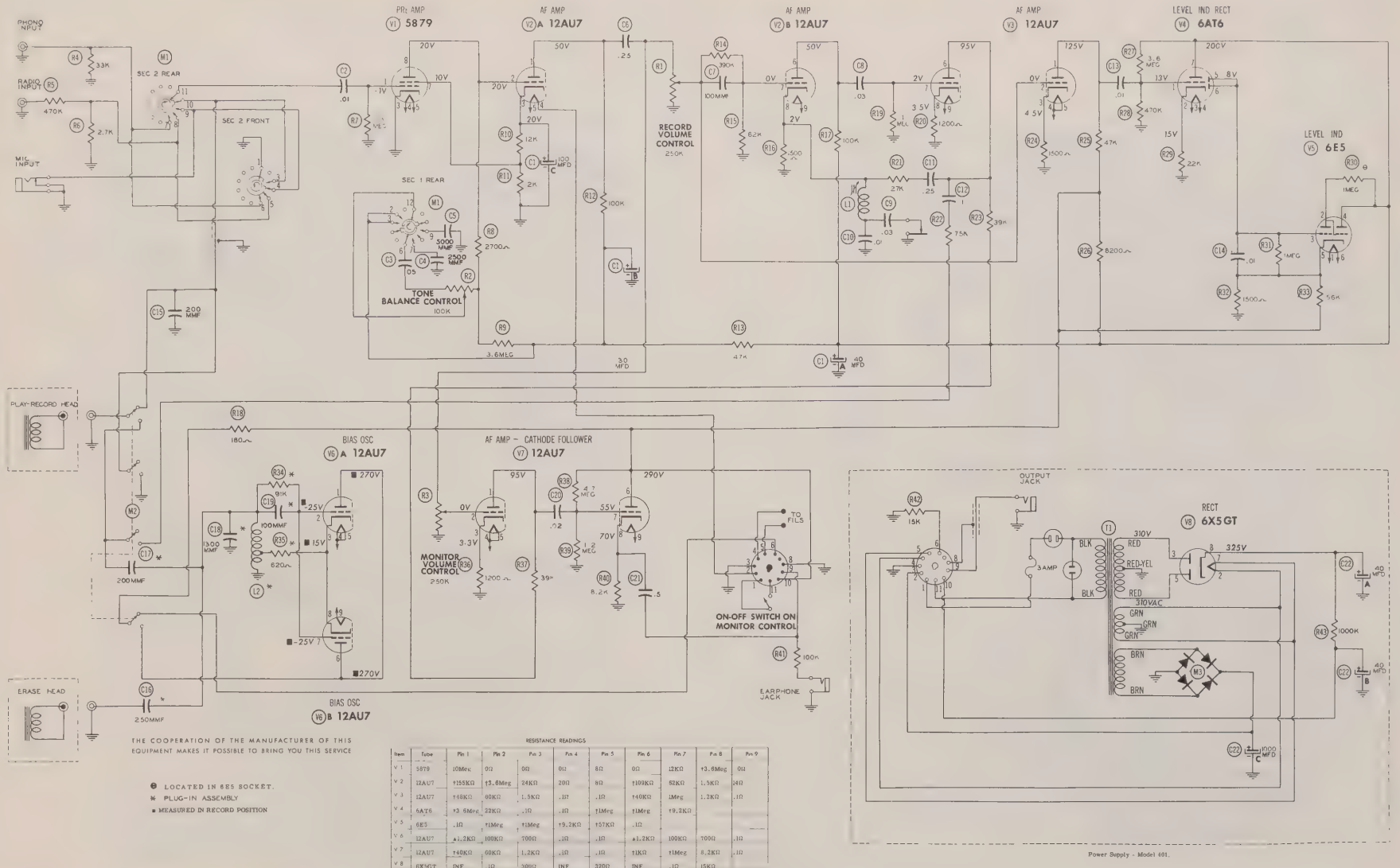
The recording head (16), capstan, and pressure roller (12) are subject to an accumulation of tape coating residue, which is worn off the tape as it passes these parts. This accumulation should be periodically removed since it may cause faint recordings and poor playback. Wipe off the above surfaces carefully with a clean cloth. If dirt is caked or hard and will not come off with a dry cloth, dampen cloth slightly with Carbon Tetrachloride.



Top View - Model 401 Power Supply.



Bottom View - Model 401 Power Supply.



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

● LOCATED IN 6E5 SOCKET.
* PLUG-IN ASSEMBLY
▪ MEASURED IN RECORD POSITION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	5879	10Meg	0Ω	0Ω	0Ω	8Ω	0Ω	12KΩ	†3.6Meg	0Ω
V 2	12AU7	†155KΩ	†3.6Meg	24KΩ	20Ω	8Ω	†109KΩ	62KΩ	1.5KΩ	24Ω
V 3	12AU7	†48KΩ	60KΩ	1.5KΩ	.1Ω	.1Ω	†40KΩ	1Meg	1.2KΩ	.1Ω
V 4	6AT6	†3.6Meg	22KΩ	.1Ω	.1Ω	†1Meg	†1Meg	†9.2KΩ		
V 5	6E5	.1Ω	†1Meg	†1Meg	†9.2KΩ	†57KΩ	.1Ω			
V 6	12AU7	▲1.2KΩ	100KΩ	700Ω	.1Ω	.1Ω	▲1.2KΩ	100KΩ	700Ω	.1Ω
V 7	12AU7	†40KΩ	60KΩ	1.2KΩ	.1Ω	.1Ω	†1KΩ	†1Meg	8.2KΩ	.1Ω
V 8	6X5GT	INF	.1Ω	300Ω	INF	320Ω	INF	.1Ω	15KΩ	

† MEASURED FROM PIN 8 OF V8
▲ MEASURED IN RECORD POSITION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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251-5

Pre-Amplifier and Power Supply Schematic - Model 401.

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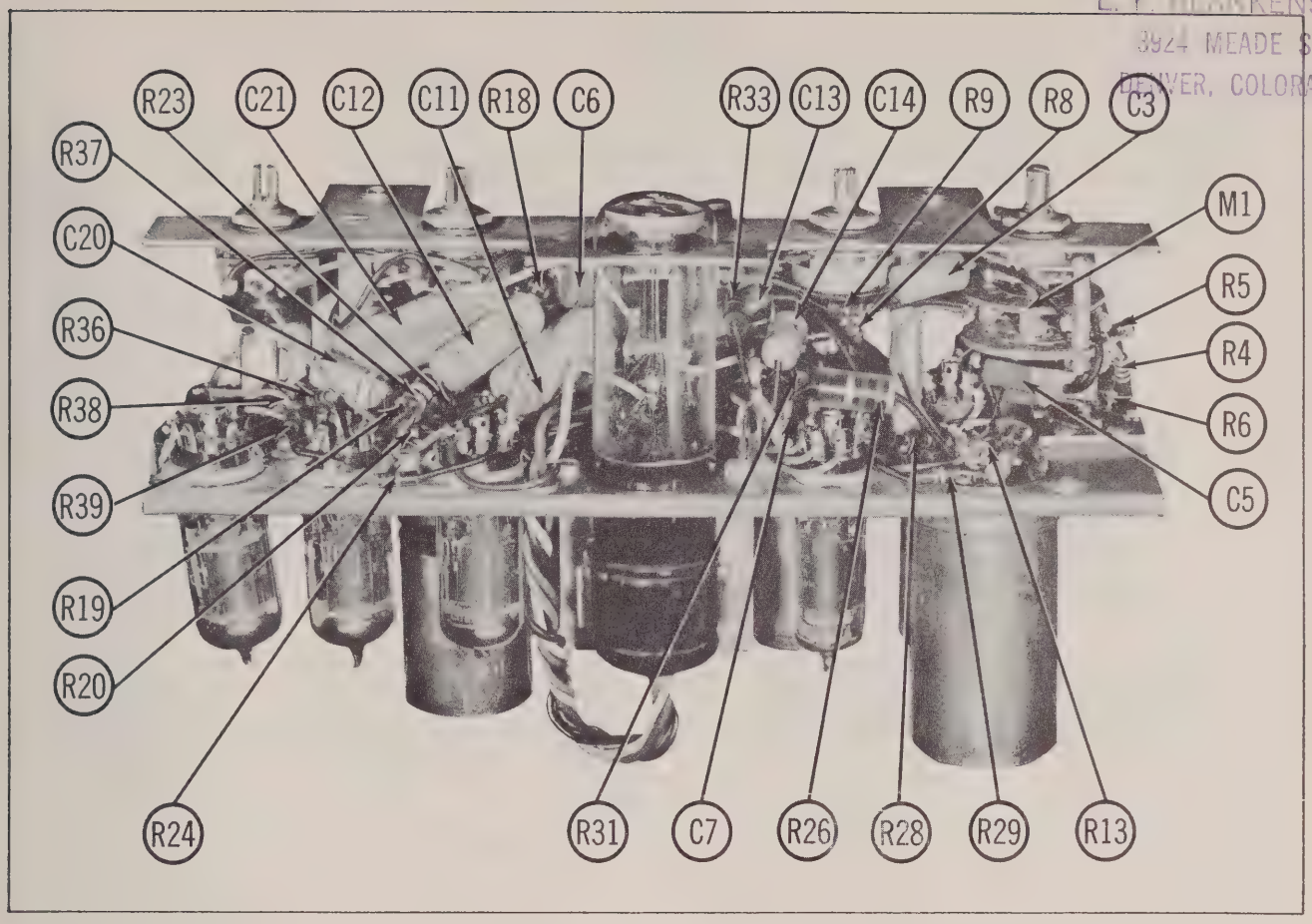
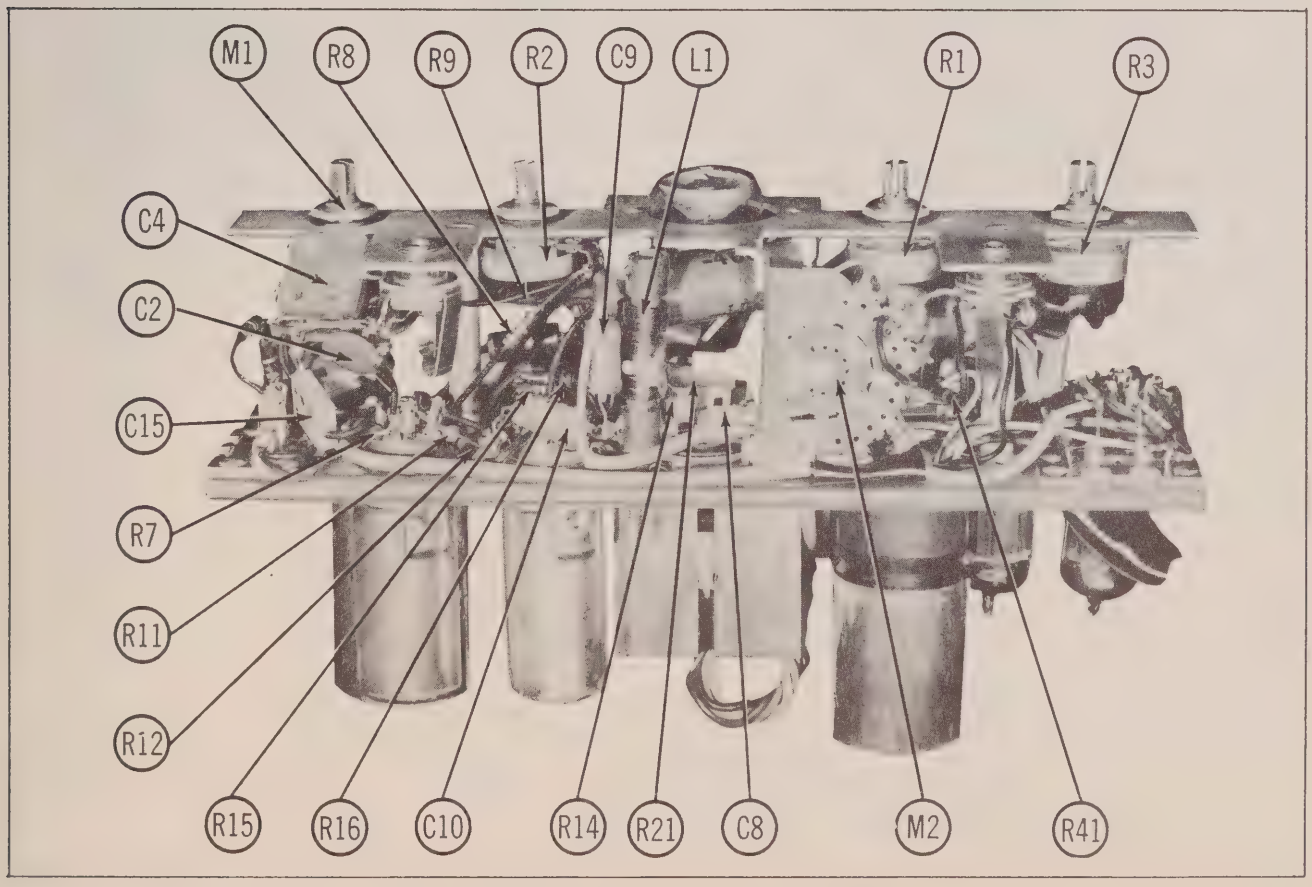
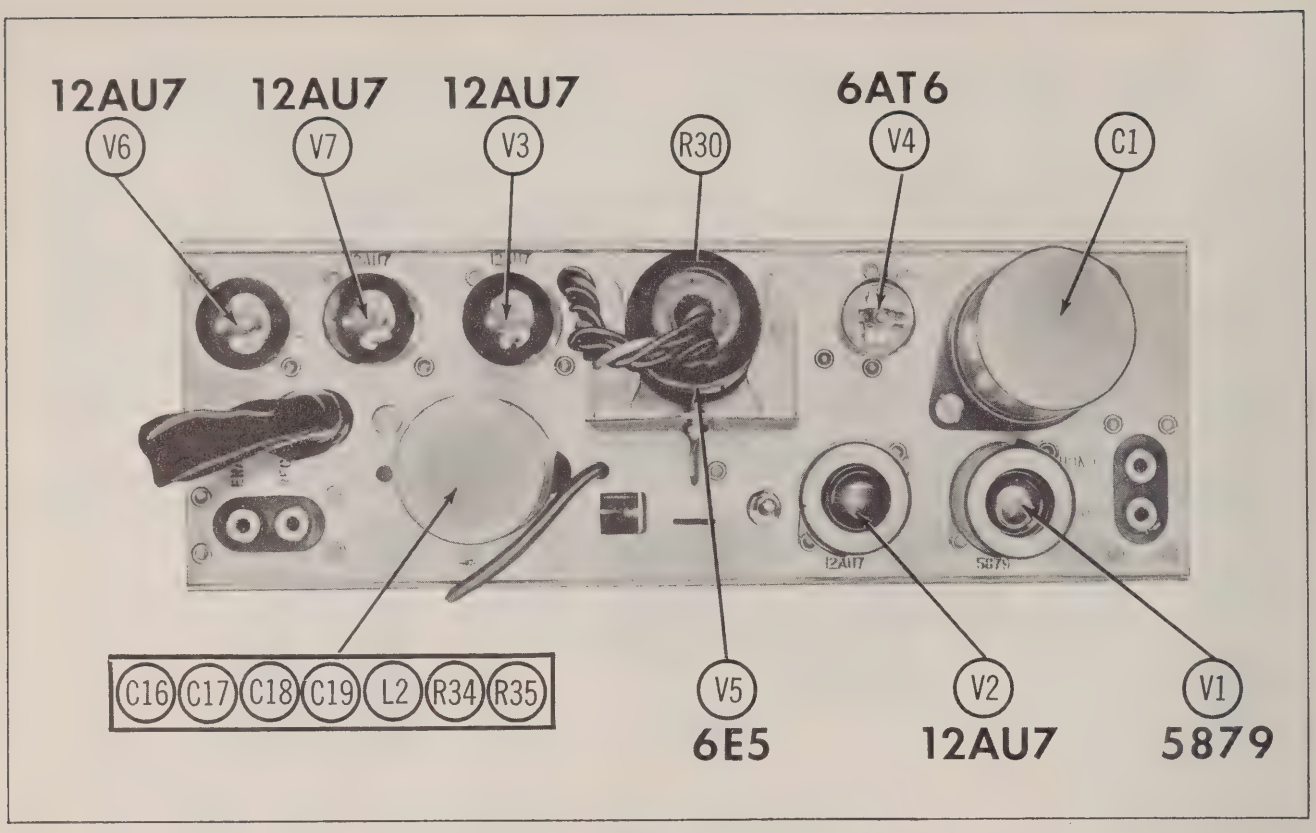


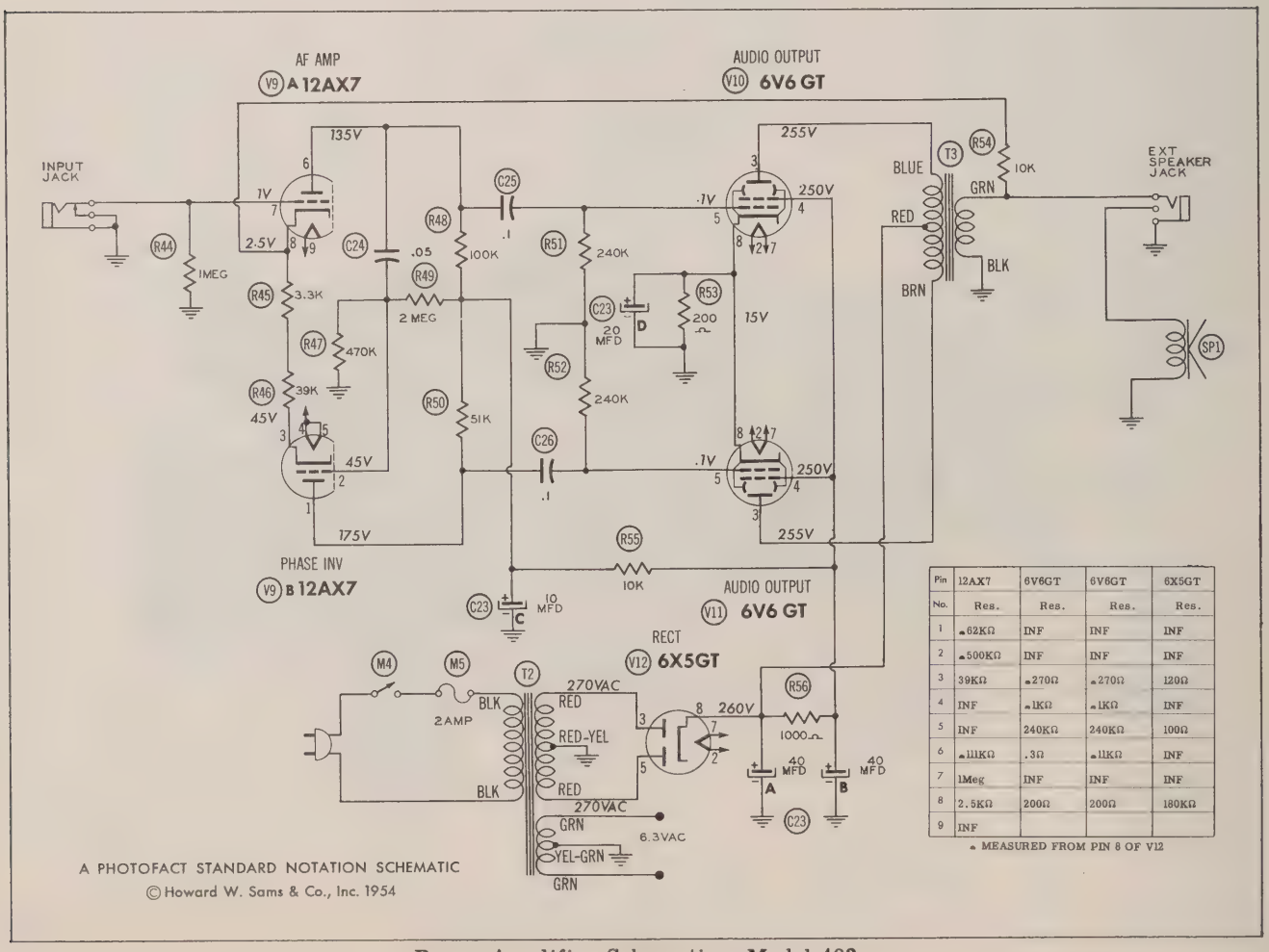
Front Side View - Model 401 Pre-Amplifier.



Rear Side View - Model 401 Pre-Amplifier.



Bottom View - Model 401 Pre-Amplifier.



Pin No.	12AX7 Res.	6V6GT Res.	6V6GT Res.	6X5GT Res.
1	▲62KΩ	INF	INF	INF
2	▲500KΩ	INF	INF	INF
3	39KΩ	▲270Ω	▲270Ω	120Ω
4	INF	▲1KΩ	▲1KΩ	INF
5	INF	240KΩ	240KΩ	100Ω
6	▲111KΩ	.3Ω	▲11KΩ	INF
7	1Meg	INF	INF	INF
8	2.5KΩ	200Ω	200Ω	180KΩ
9	INF			

▲ MEASURED FROM PIN 8 OF V12

Power Amplifier Schematic - Model 402

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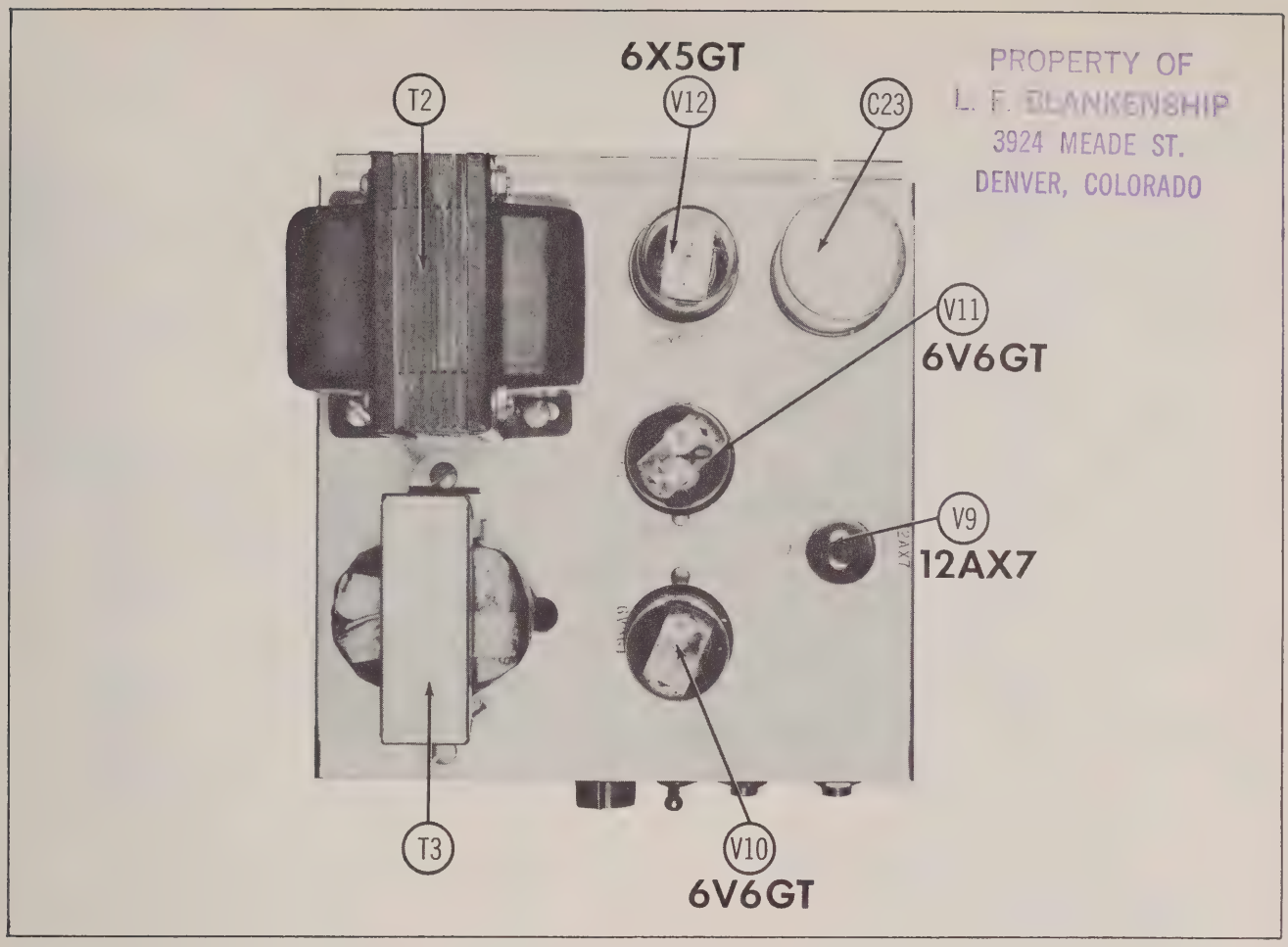
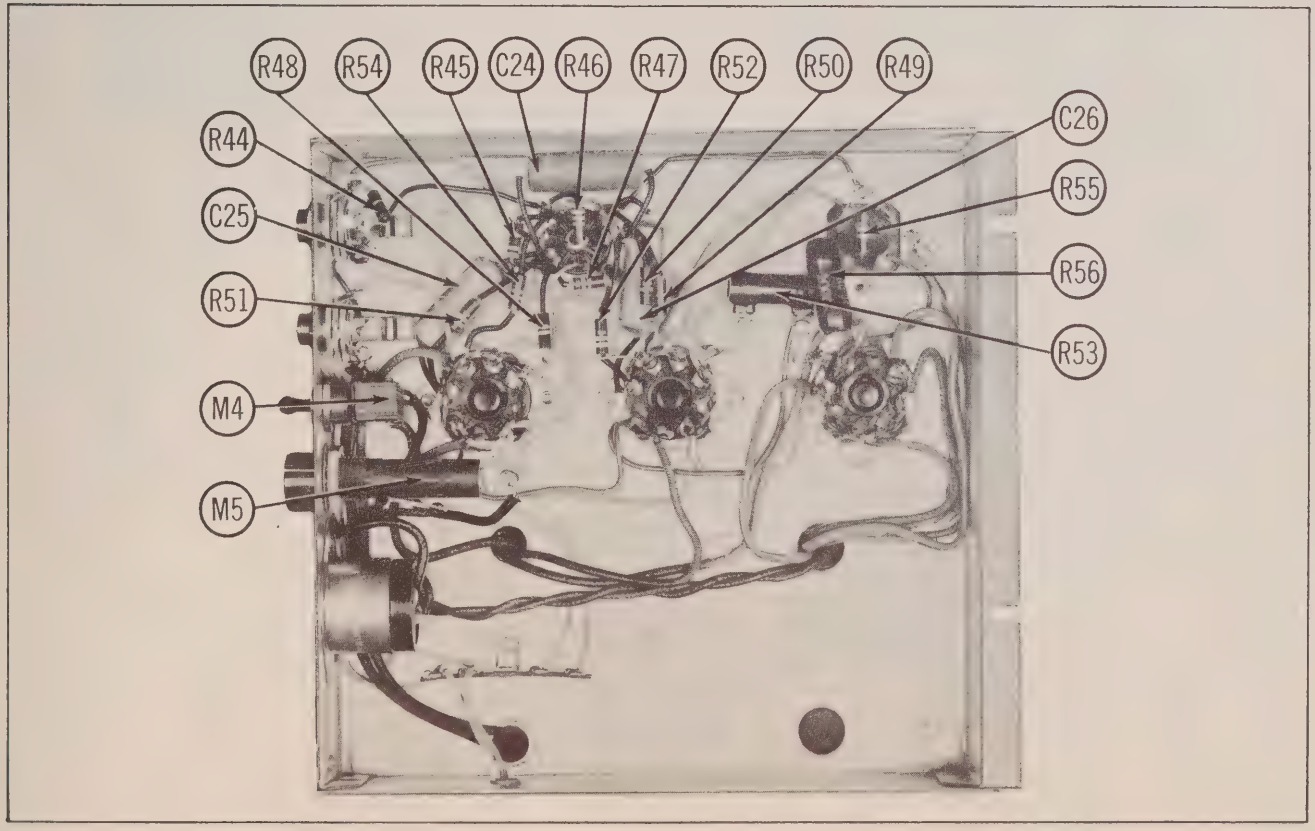


Top View - Model 402 Power Amplifier.



Bottom View - Model 402 Power Amplifier.

MECHANICAL PARTS LIST
CRESTWOOD MODEL 401

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	1810	Forward-Reverse Knob	41	9040-13	Brake Bar
2	1808	Speed Change Knob	42	9040-98	7 1/2 Idler Spring
3	3519	Control Panel Assembly	43	9040-98	3 3/4 Idler Spring
4	1754	Head Cover	44	9040-122	Idler Assembly "E" Ring
5	1766	Main Cover	45	9040-79	Idler Cam Spacer
6	1413	Main Cover Mounting Screw	46	9040-73	Idler Cam Washer
7	1413	Head Cover Mounting Screw	47	9040-178	Control Shaft Assembly
8	1805	Fast Forward Knob	48	9040-170	Lever Cam Assembly
9	1400	Control Panel Grommet	49	9040-121	Lever Cam "E" Ring
10	1379	Control Panel Screw	50	9040-34	Flywheel Assembly
11	1403	Control Panel Screw Washer	51	9040-41	Felt Washer
12	9040-192	Pressure Roller	52	9040-43	Flywheel Washer
13	9040-148	Pressure Roller Clip	53	9040-171	Fast Forward Pulley Assembly
14	9040-146	Pressure Roller Washer	54	9040-123	Fast Forward Pulley "E" Ring
15	9040-182	Pressure Release Lever Assy.	55	9040-48	Forward Drive Belt
16	2000	Record Head	56	9040-219	Spindle Pulley-Right
17	2001	Erase Head	57	9040-219	Spindle Pulley-Left
18	9040-161	Record Head Bracket	58	9040-181	Rewind Pulley Assembly
19	9040-161	Erase Head Bracket	59	9040-123	"E" Ring
20	9040-2	Heads Mounting Bracket	60	9040-146	Fibre Washer
21	9040-173	Pressure Roller Slide Plate Assy.	61	9040-49	Rewind Drive Belt
21A		Arm Adjusting Plate	62	9040-183	Take-Up Brake Assembly
21B		Pressure Arm	63	9040-88	Take-Up Brake Spring
22	9040-86	Pressure Roller Slide Plate Spring	64	9040-71	Brake Bar Spring
23	3547	Tape Guide Assembly	65	9040-164	Fast Forward Brake Assembly
23A		Tape Guide Mounting Screw	66	9040-82	Fast Forward Brake Spring
24	9040-111	Take-Up Belt	67	9040-174	Rewind Idler Assembly
25		Rewind Spindle Assembly (Part of Upper Mechanism Plate 33)	68	9040-84	Rewind Idler Spring
			69	9040-122	Rewind Idler "E" Ring
26	9040-172	Take-Up Idler Assembly	70	9040-73	Rewind Idler Washer
27	9040-87	Take-Up Idler Spring	71	9040-224	Rewind Control Arm Assembly
28	9040-29	Take-Up Idler Stop	72		Lower Mechanism Plate
29	9040-104	Take-Up Idler Button	73	9040-165	Motor Assembly (Complete)
30	9040-64	Pressure Release Lever Button	74	9040-90	Rubber Motor Mounts
31	9040-120	Pressure Release Lever Washer	75	9040-113	Motor Mounting Washer
32		Take-Up Spindle Assembly	76	9040-84	Forward Control Spring
33		Upper Mechanism Plate	77	9040-83	Detent Spring
34	9040-209	Azimuth Spring	78	9040-69	Detent Slide Shouldered Nut
35	9040-3	Detent Slide	79	9040-109	Steel Thrust Washer
36	9040-188	Fast Forward Control Assembly	80	9040-90	Rubber Grommet
37	9040-222	Fast Forward Control Retaining Ring	81	9040-214	Socket Head Screw
			82	9040-46	Lever Cam Roller
38	9040-9	Speed Change Cam	83	9040-46	Control Shaft Roller
39	9040-169	7 1/2 Idler Assembly	84	9040-189	Cam And Bushing Assembly
40	9040-175	3 3/4 Idler Assembly	85	9040-220	Switch Cam

POWER AMPLIFIER PARTS LIST
CRESTWOOD MODEL 402

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V9		12AX7, AF Amp., Phase Inv.	R48	9	100KΩ, 1/2 Watt, 10%
V10		6V6GT, Audio Output	R49	31	2 Meg., 1/2 Watt, 5%
V11		6V6GT, Audio Output	R50	34	51KΩ, 1/2 Watt, 5%
V12		6X5GT, Rectifier	R51	35	240KΩ, 1/2 Watt, 5%
C23A	352	Elect. Cap., 40mfd. @ 300V.	R52	35	240KΩ, 1/2 Watt, 5%
C23B		Elect. Cap., 40mfd. @ 300V.	R53	36	200Ω, 5 Watt, 20%, W.W.
C23C		Elect. Cap., 10mfd. @ 300V.	R54	4	10KΩ, 1/2 Watt, 10%
C23D		Elect. Cap., 20mfd. @ 15V.	R55	4	10KΩ, 1/2 Watt, 10%
C24	217	.05mfd. @ 400V.	R56	30	1000Ω, 5 Watt, 20%, W.W.
C25	216	.1mfd. @ 400V.	T2	1151	Power Transformer
C26	216	.1mfd. @ 400V.	T3	1152	Output Transformer
R44	13	1 Meg., 1/2 Watt, 10%	SP1	2350	Speaker
R45	32	3.3KΩ, 1/2 Watt, 10%	M4	452	Switch, SPST
R46	33	39KΩ, 1/2 Watt, 10%	M5	556	Fuse, 2 Amp.
R47	1	470KΩ, 1/2 Watt, 10%		555	Fuse Holder

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PRE-AMPLIFIER PARTS LIST
CRESTWOOD MODEL 401

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1		5879, Pre-Amplifier	R9	22	3.6Meg., 1/2 Watt, 5%
V2		12AU7, AF Amplifier	R10	39	12KΩ, 1/2 Watt, 5%
V3		12AU7, AF Amplifier	R11	39	12KΩ, 1/2 Watt, 5%
V4		6AT6, Level Indicator Rectifier	R12	9	100KΩ, 1/2 Watt, 10%
V5		6E5, Record Level Indicator	R13	12	47KΩ, 1/2 Watt, 10%
V6		12AU7, Bias Oscillator	R14	53	390KΩ, 1/2 Watt, 5%
V7		12AU7, Cathode Follower	R15	42	62KΩ, 1/2 Watt, 5%
C1A	350	Elect. Cap., 40mfd.@300V.	R16	11	1500Ω, 1/2 Watt, 5%
C1B		Elect. Cap., 30mfd.@250V.	R17	9	100KΩ, 1/2 Watt, 10%
C1C		Elect. Cap., 100mfd.@25V.	R18	27	180Ω, 1/2 Watt, 10%
C2	201	.01mfd. @600V.	R19	13	1 Meg., 1/2 Watt, 10%
C3	214	.05mfd. @200V.	R20	14	1200Ω, 1/2 Watt, 10%
C4	203	2500mmf. @500V., 5%	R21	8	27KΩ, 1/2 Watt, 5%
C5	204	5000mmf. @500V., 5%	R22	16	75KΩ, 1/2 Watt, 5%
C6	202	.25mfd. @400V.	R23	15	39KΩ, 1 Watt, 10%
C7	205	100mmf. @500V., 5%	R24	20	1500Ω, 1/2 Watt, 10%
C8	207	.03mfd. @400V.	R25	12	47KΩ, 1/2 Watt, 10%
C9	219	.03mfd. @400V., 5%	R26	21	8200Ω, 2 Watt, 10%
C10	221	.01mfd. @200V., 5%	R27	22	3.6Meg., 1/2 Watt, 5%
C11	218	.25mfd. @400V.	R28	1	470KΩ, 1/2 Watt, 10%
C12	208	.1mfd. @400V.	R29	18	22KΩ, 1/2 Watt, 10%
C13	210	.01mfd. @400V.	R30		1 Meg., 1/2 Watt, 10%
C14	212	.01mfd. @200V.	R31	13	1 Meg., 1/2 Watt, 10%
C15	200	200mmf. @500V.	R32	20	1500Ω, 1/2 Watt, 10%
C16*	226	250mmf. @500V., 5%	R33	19	56KΩ, 1 Watt, 10%
C17*	229	200mmf. @500V., 5%	R34*	43	91KΩ, 1/2 Watt, 5%
C18*	228	1300mmf. @500V., 5%	R35*	44	620Ω, 1 Watt, 5%
C19*	227	100mmf. @500V., 5%	R36	14	1200Ω, 1/2 Watt, 10%
C20	213	.02mfd. @400V.	R37	15	39KΩ, 1 Watt, 10%
C21	220	.5mfd. @400V.	R38	24	4.7 Meg., 1/2 Watt, 10%
R1	650	Record Volume Cont., 250KΩ	R39	25	1.2 Meg., 1/2 Watt, 10%
R2	652	Tone Balance Control, 100KΩ	R40	26	8.2KΩ, 1 Watt, 10%
R3	651	Monitor Volume & Switch, 250KΩ	R41	9	100KΩ, 1/2 Watt, 10%
R4	38	33KΩ, 1/2 Watt, 10%	L1	1253	Coil, Tone Compensation
R5	1	470KΩ, 1/2 Watt, 10%	L2*	1254	Coil, Bias Oscillator
R6	2	2700Ω, 1/2 Watt, 10%	M1	451	Selector Switch, 3 Pole 4 Position
R7	5	10 Meg., 1/2 Watt, 10%	M2	450	Play-Record Switch, 4 Pole
R8	2	2700Ω, 1/2 Watt, 10%			2 Position

* May be obtained individually or as complete oscillator plug-in assembly part #3532.

POWER SUPPLY PARTS LIST
CRESTWOOD MODEL 401

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V8		6X5GT, Rectifier	R42	37	15KΩ, 20 Watt
C22A	351	Elect. Cap., 40mfd. @400V.	R43	30	1000Ω, 5 Watt
C22B		Elect. Cap., 40mfd. @400V.	T1	1150	Power Transformer
C22C		Elect. Cap., 1000mfd. @20V.	M3	1100	Selenium Rectifier

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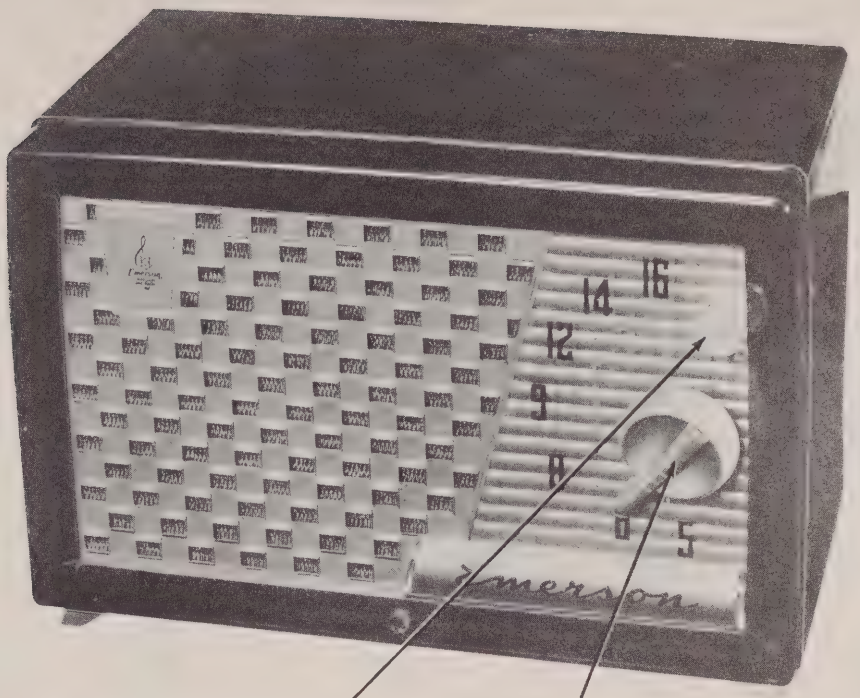
EMERSON
MODELS 729B, 779B (Ch. 120170-B)



EMERSON
MODELS 729B, 779B (Ch. 120170-B)

TRADE NAME	Emerson Models 729B, 779B (Ch. 120170-B)
MANUFACTURER	Emerson Radio & Phono Corp., 111 8th. Ave., New York, N.Y.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC
RATING	.21 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.001MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	"

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		EMERSON PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Dt.-AVC-AF Amp.	12AT6	12AT6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	EMERSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	30	150	925234	PRS150/30-30-30		BBRT33315		3N534	TVA-3444	Red Brown Green
B	30	150								
C	20	150								
C2	.05	400	923554	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C3A	220									
B	2000									
C	5000		♦923024	♦PA-113-1	♦PC-150	♦1116TM1	♦1408-01		♦DT-1	
D	250									
E										
C4	.02	400	923524	P488-02	DF-203	CUB4S2		PT412	4TM-S2	
C5	.05	400	923554	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C6	.1	400	923515	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C7	.02	400	923524	P488-02	DF-203	CUB4S2		PT412	4TM-S2	Note 1

Note 1. Not used in all models.
♦ Items C3A, C3B, C3C, C3D, C3E, R6A, R6B and R6C are combined in one unit.
When replacing items separately, C3D and C3E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	EMERSON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	390205	Q11-133	A47-500K-S	AB-59	U-50	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R1A

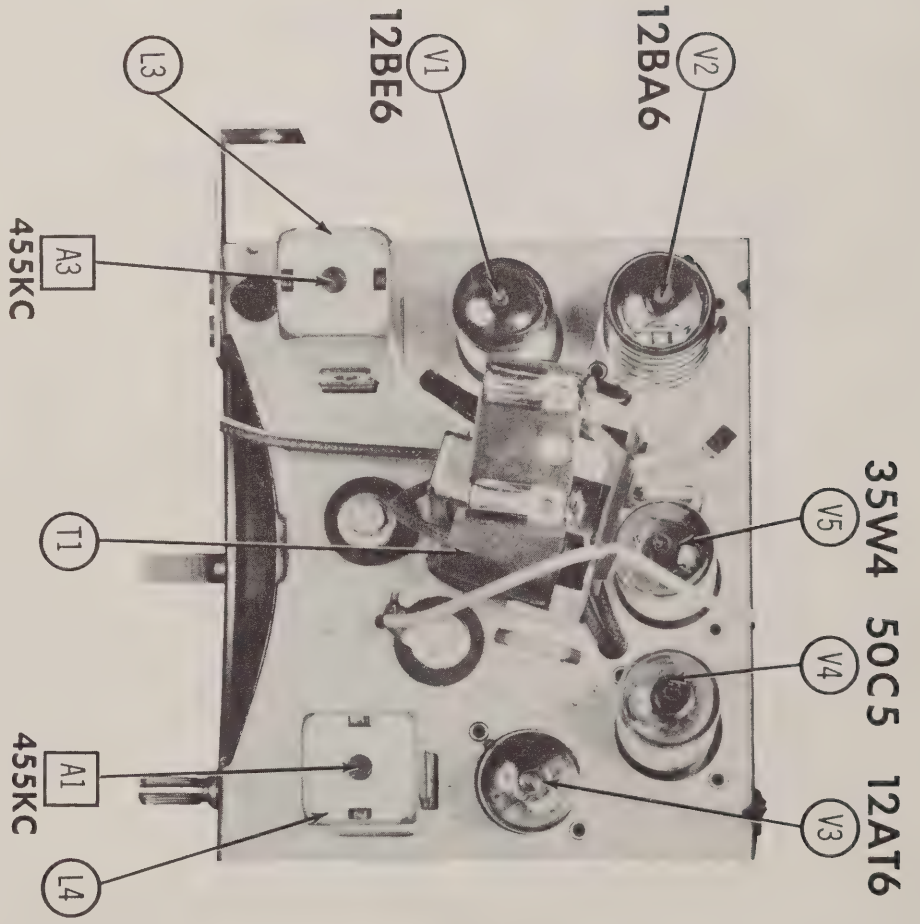
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	EMERSON PART No.	IRC PART No.	
R2	22KΩ	½		BTS-22K	Note 1
R3	220KΩ	½		BTS-220K	
R4	120Ω	½	340272	BTS -120	
R5	3.3Meg	½	351332	BTS-3.3Meg	
R6A	6.8Meg	½		BTS-6.8Meg	
B	470KΩ	½	♦923024	BTS-470K	
C	470KΩ	½		BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	EMERSON PART No.	IRC PART No.	
R7	10KΩ	½	350732	BTS-10K	
R8	150Ω	½	340292	BTS-150	
R9	1200Ω	1	370512	BTA-1200	
R10	100Ω	1	370252	BTA-100	
R11	18Ω	½	340072	BTS-18	

Note 1. Not used in all models.
♦ Items R6A, R6B, R6C, C3A, C3B, C3C, C3D, C3E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: EMERSON PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.3KΩ	3.4Ω	734082 734079 ①	A-3332	A-3025	S-12X	Z1101		① Alternate transformer

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA: EMERSON PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	6"	PM	3.4Ω	180095	ST-108 Mod. P6-X	6A1	

COILS (RF-IF)

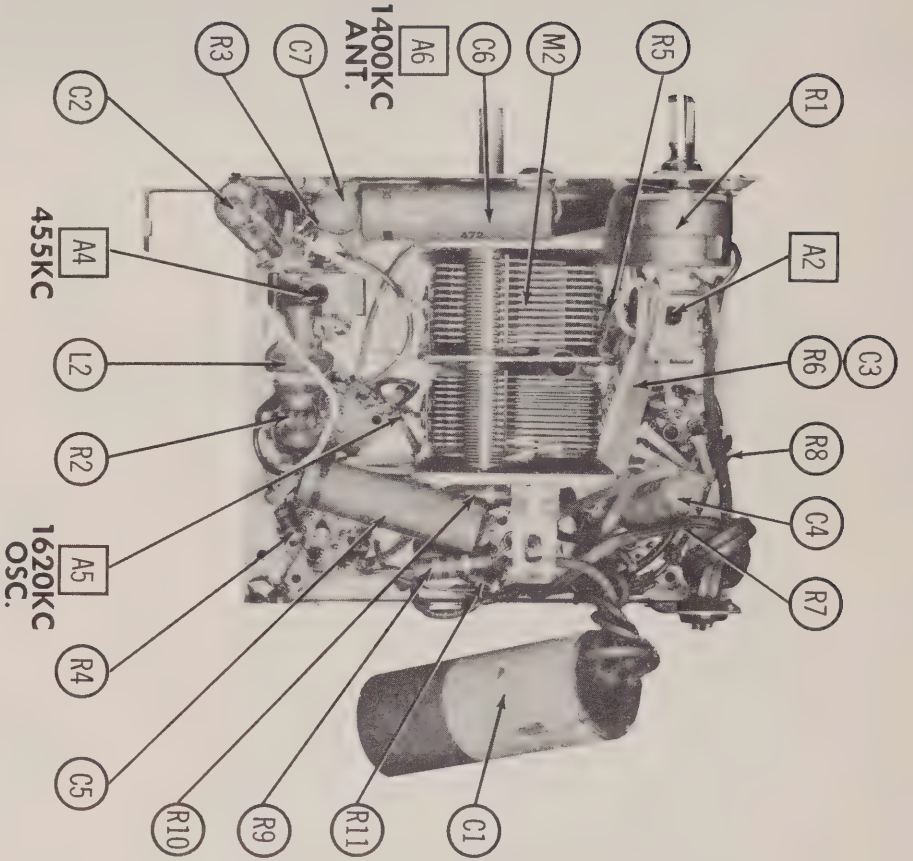
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: EMERSON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Ant.	0Ω	3.2Ω	700076				
L2	Osc. Coil	.5Ω	6.5Ω	716076	14-1073		69-Osc. †	
L3	Input IF	17Ω	17Ω	720033	16-6758	BC-352	12-C1	
L4	Output IF	17Ω	17Ω	720033	16-6758	BC-353	12-C2	

† Drill mounting hole.

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M1	Dial Light	807000	#47 Bayonet
M2	Tuning Cap.	900092	32-390 & 30-175MMF
	Cabinet Body	140483	Ivory - Model 729B
	Cabinet Body	140483C	Red - Model 729B
	Cabinet Body	140483D	Blue - Model 729B
	Cabinet Body	140483E	Green - Model 729B
	Cabinet Body	140548	Wood - Model 779B
	Cabinet Front	460339	For part #140483, 140483C and 140548
	Cabinet Front	460339A	For part #140483D
	Cabinet Front	460339B	For part #140483E
	Knob	460312A	Tuning - Model 729B
	Knob	460312B	Tuning - Model 779B
	Knob	460311	Volume

CHASSIS—BOTTOM VIEW



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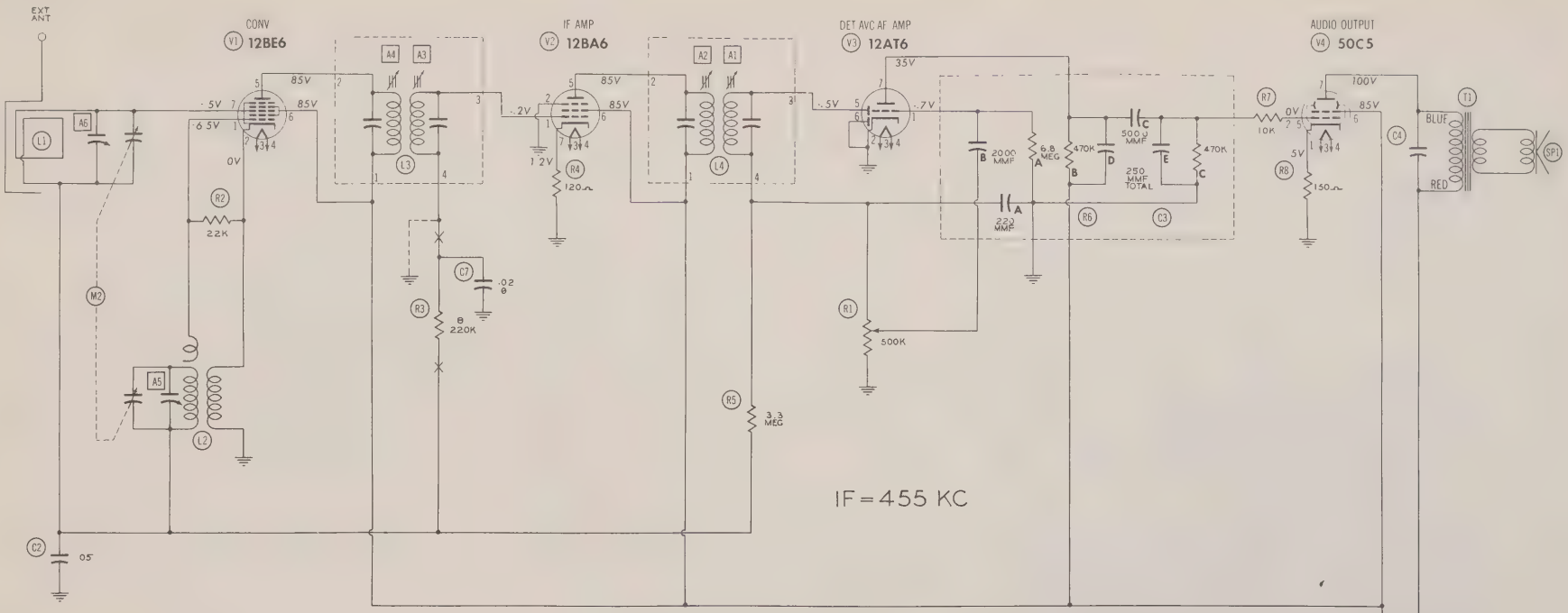
EMERSON
MODEL 729B (Ch. 120170-B)



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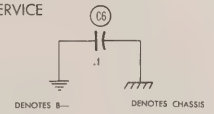
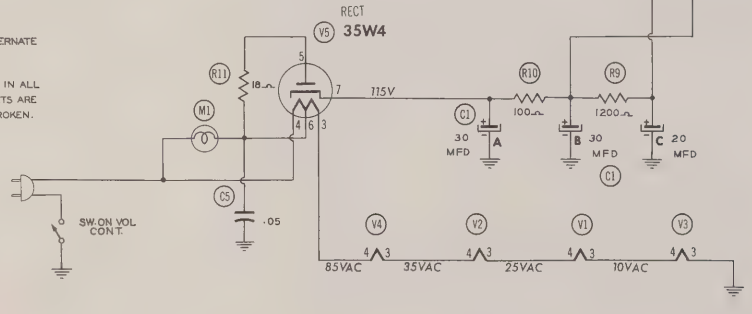
θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	2.5KΩ	.7Ω	13Ω	5Ω	†1.3KΩ	†1.3KΩ	3.8Meg
V 2	12BA	4Meg	0Ω	.5Ω	3oΩ	†1.3KΩ	†1.3KΩ	120Ω
V 3	12AT6	6.8Meg	0Ω	0Ω	12Ω	500KΩ	0Ω	†470KΩ
V 4	50C5	150Ω	480KΩ	36Ω	85Ω	480KΩ	†1.3KΩ	†300Ω
V 5	35W4	†100Ω	†100Ω	85Ω	118Ω	133Ω	115Ω	200KΩ

† MEASURED FROM PIN 7 OF V5

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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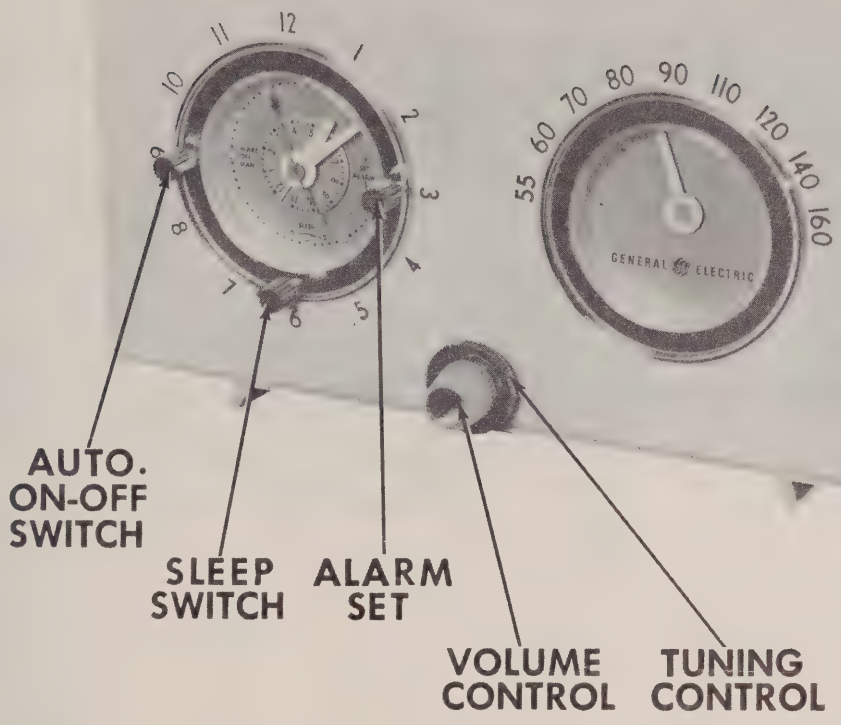

GENERAL ELECTRIC
MODELS 564, 565, 566

TRADE NAME	General Electric Models 564, 565, 566
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	AC Operated AM Superheterodyne Receiver with Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles RATING .23 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial. Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 1 (grid) of 12BA6 (V2). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	"	"	"	A3, A4	Adjust A3, A4, A1 and A2 for maximum output.
3.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	1500KC	Tune for max. signal	"	A6	"

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	50	150	RCE-160	PRS150/50-		BBRD-5515		2N521	TVA-2453	
B	50	150		50						
C2	.05	400	UCC-045	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C3	47		RCW-3075							
C4A	400				D6-401	TP45	GP1K-401	UC-534	5GA-T4	
B	2000		RCW-3048	PA-100-4	DD-102	K072	801-002	DC-522	5HK-D2	
C	220				D6-221	TP39	GP1K-221	UC-5322	5GA-T22	
D	5000				DD-502	K080	801-005	DC-525	5HK-D5	
C5	.022	600	RCN-050	P688-022		CUB6S22		PT6122	6TM-S22	
C6	.047	600	RCN-053	689ZX-047	DF-503	PJ6S47		PT6147	6TM-S47	
C7	.05	400	UCC-045	P488-05	DF-503	CUB4S5		PT415	4TM-S5	

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500KΩ	½	RCC-212					Volume

RESISTORS

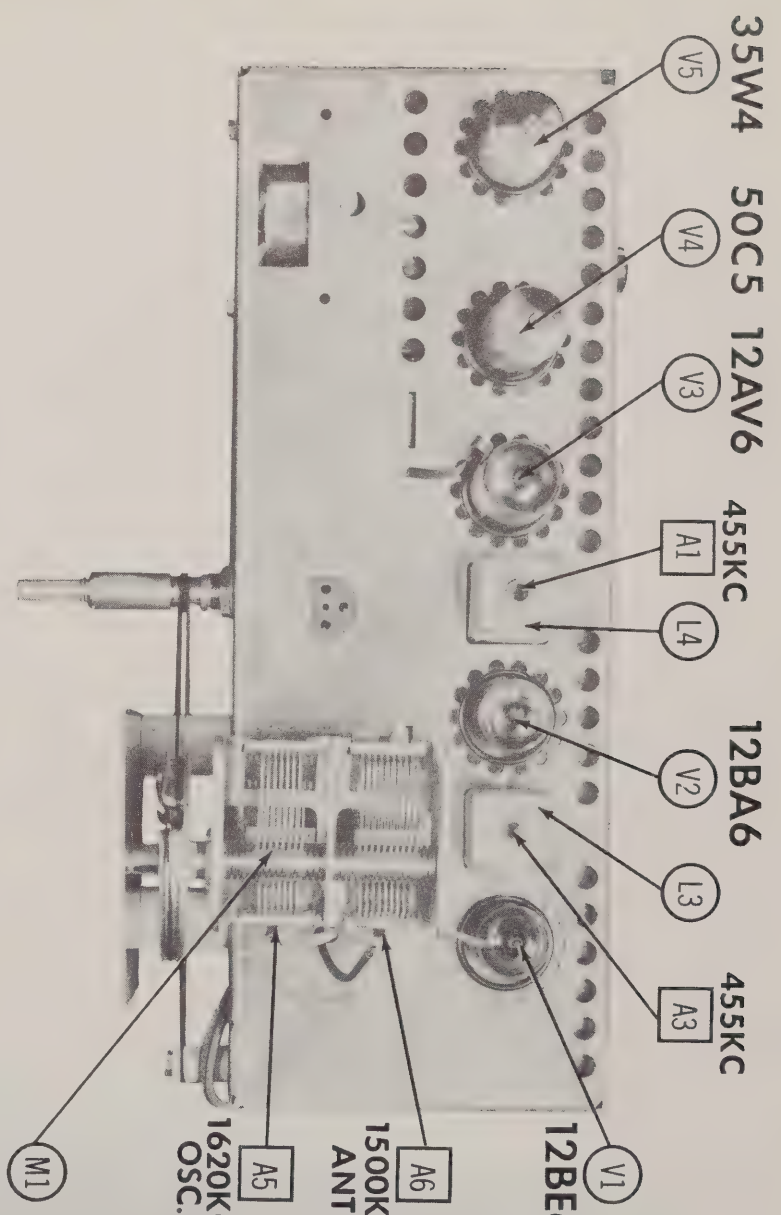
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	22KΩ	½	URD-081	BTS-22K	
R3	100Ω	1	URD-025	BTS-100	
R4	68Ω	2	URD-021	BTS-68	
R5	2.2Meg	½	URD-129	BTS-2.2Meg	
R6	6.8Meg	½	URD-141	BTS-6.8Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R7	470KΩ	½	URD-113	BTS-470K	
R8	470KΩ	½	URD-113	BTS-470K	
R9	150Ω	½	URD-029	BTS-150	
R10	1500Ω	2	URF-053	BTB-1500	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: General Electric PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.5KΩ	3.8Ω	RTO-138		A-3031 ①			T-24S50A①	① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

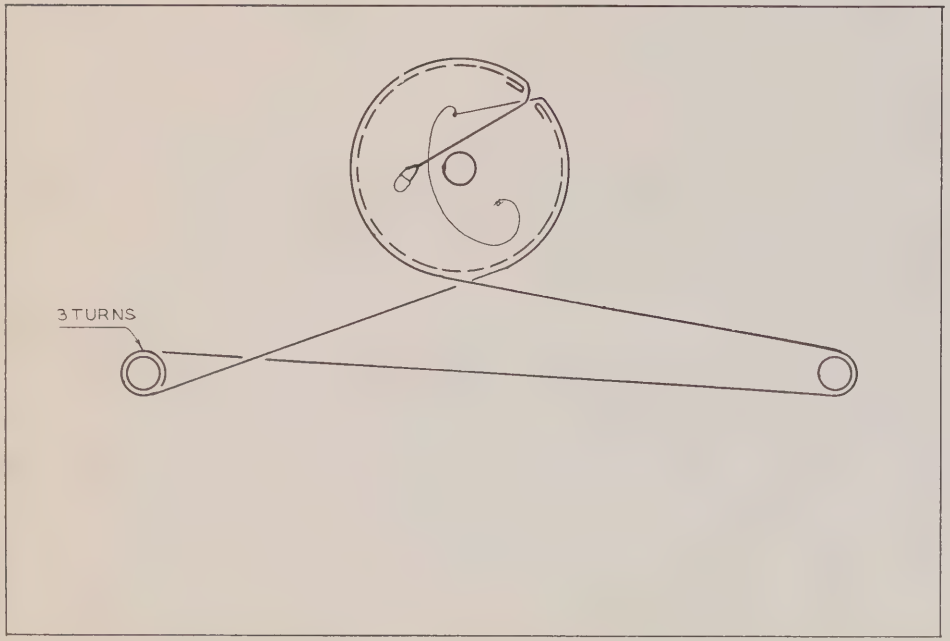
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	General Electric PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.8Ω	ROR-027	ST-113 Mod. P4-X	4A1	

COILS (RF-IF)

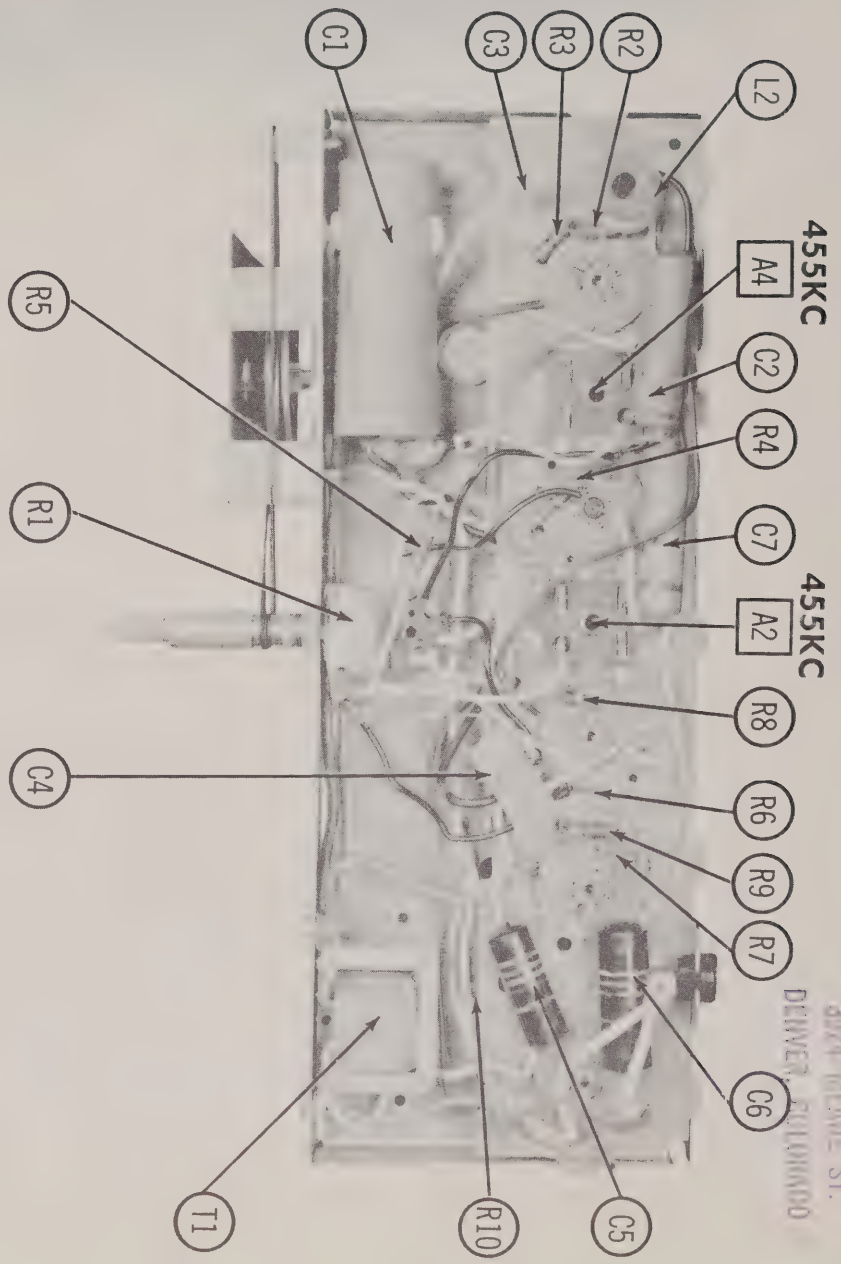
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.4Ω		RLL-055				
L2	Osc. Coil	.5Ω	6.5Ω	RLC-122	14-1074		70-Osc.	
L3	Input IF	13Ω	13Ω	RTL-143	16-6758	BC-352	12-C1	
L4	Output IF	13Ω	13Ω	RTL-143	16-6758	BC-353	12-C2	

MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M1	Tuning Cap.	RCT-069	(27-320MMF, 23-150MMF)
M2A	Clock	RZC-026	With switch (early models) } these assemblies may be
B	Clock	RZC-032	With switch (late models) } interchanged if original part not available
	Cabinet	RAU-379	Ivory - Model 564
	Cabinet	RAU-383	Red - Model 565
	Cabinet	RAU-384	Green - Model 566
	Knob	RDK-323	Volume - grey
	Knob	RDK-322	Tuning - maroon - Model 564
	Knob	RDK-353	Tuning - black - Models 565, 566
	Knob	RZK-018	Clock - 3 used - maroon - Model 564
	Knob	RZK-019	Clock - 3 used - black - Models 565, 566



CHASSIS—BOTTOM VIEW



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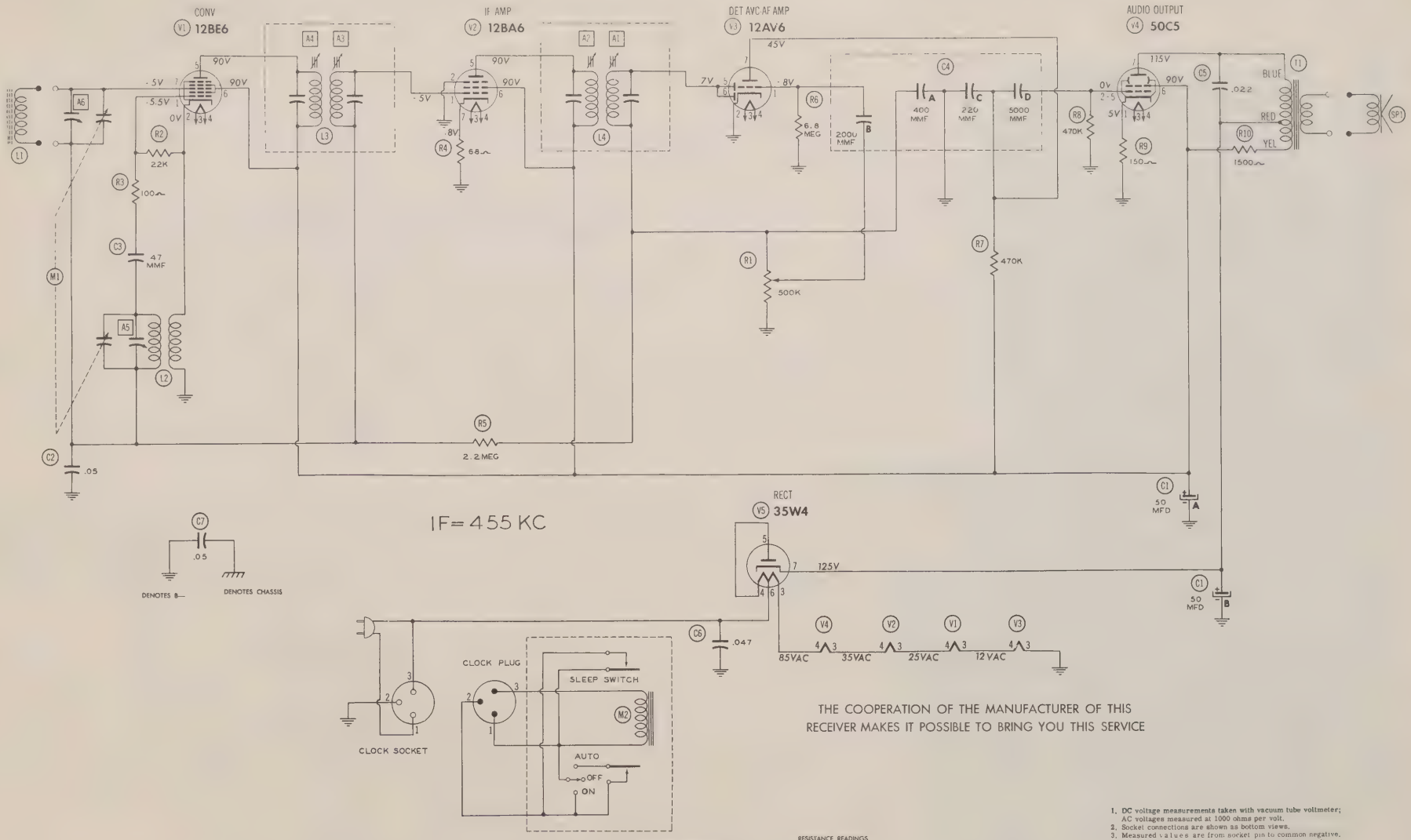
GENERAL ELECTRIC
MODEL 564

GENERAL ELECTRIC
MODEL 564



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	12Ω	24Ω	†1.5KΩ	†1.6KΩ	2.7Meg
V 2	12BA6	2.7Meg	0Ω	24Ω	36Ω	†1.5KΩ	†1.5KΩ	68Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	500KΩ	500KΩ	†470KΩ
V 4	50C5	150Ω	470KΩ	86Ω	84Ω	470KΩ	†1.5KΩ	†225Ω
V 5	35W4	INF	8Ω	84Ω	120Ω	120Ω	110Ω	120KΩ

† MEASURED FROM PIN 7 OF V5

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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*TRADE MARK

RETMA MEMBER

GOTHAM
MODEL 323

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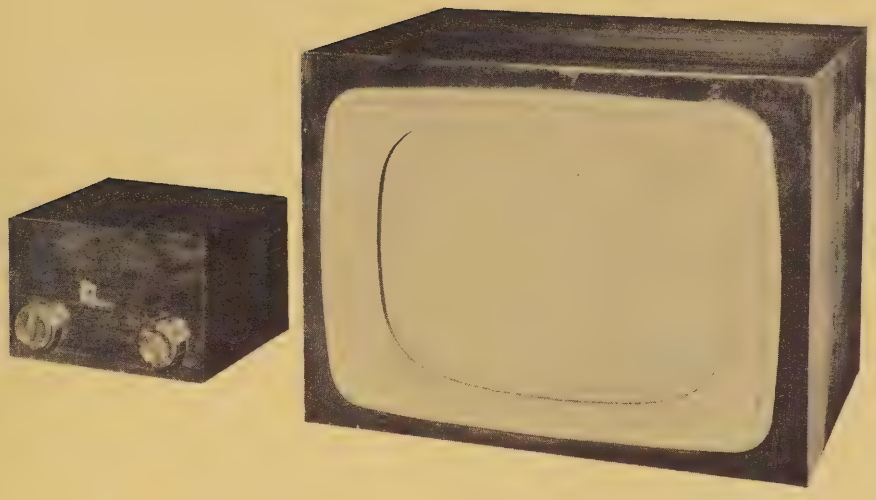

GOTHAM
MODEL 323

MODEL 323

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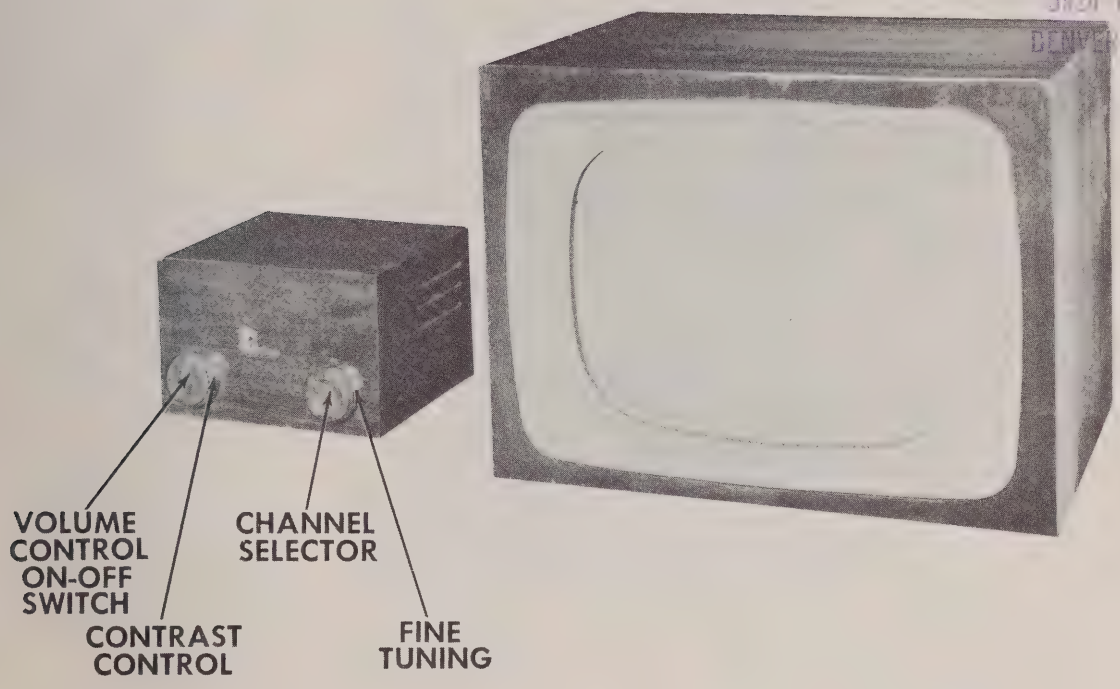

GOTHAM MODEL 323

TRADE NAME	Gotham Model 323		
MANUFACTURER	Gotham Television Corp., 123 W. 64th. St., New York, 23, N.Y.		
TYPE SET	Television Receiver		
TUBES	Twenty-three		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING	.64 Amp. @ 117 Volts AC (RF-IF Chassis) 1.48 Amp. @ 117 Volts AC (Sweep Chassis)
TUNING RANGE	Channels 2 thru 13, Video IF 26.1MC, Sound IF 21.6MC (Intercarrier)		

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 18
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions 14, 15, 16
Photographs
Cabinet-Rear View 11
Capacitor Identification (RF-IF Chassis) 4
Capacitor Identification (Sweep Chassis) 9
Chassis-Top View (RF-IF Chassis) 3
Chassis-Top View (Sweep Chassis) 3
RF Tuner 10
Photographs (Con't)
Resistor , Inductor & Alignment Identification (RF-IF Chassis) . 13
Resistor Identification (Sweep Chassis) 20
Trans. & Inductor Identification (Sweep Chassis) 19
Resistance Measurements 8
Servicing in the Field 18
Schematic 2
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

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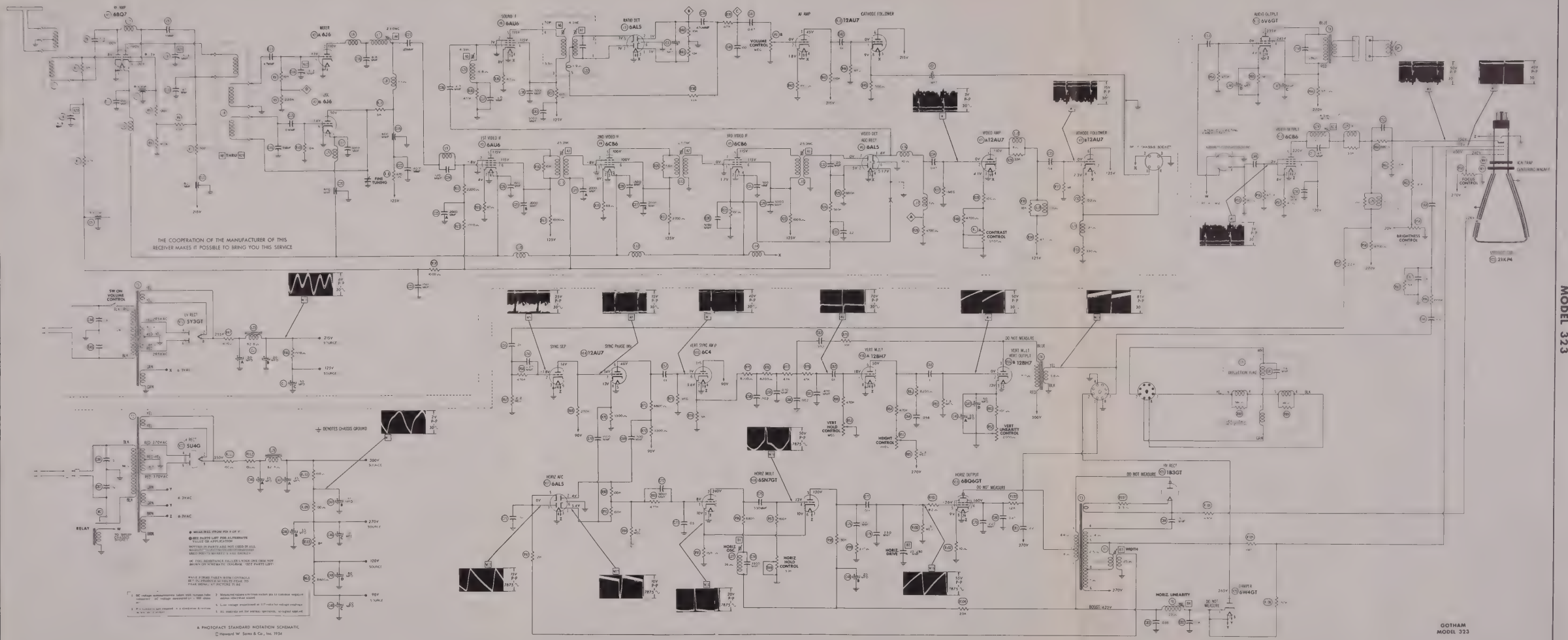
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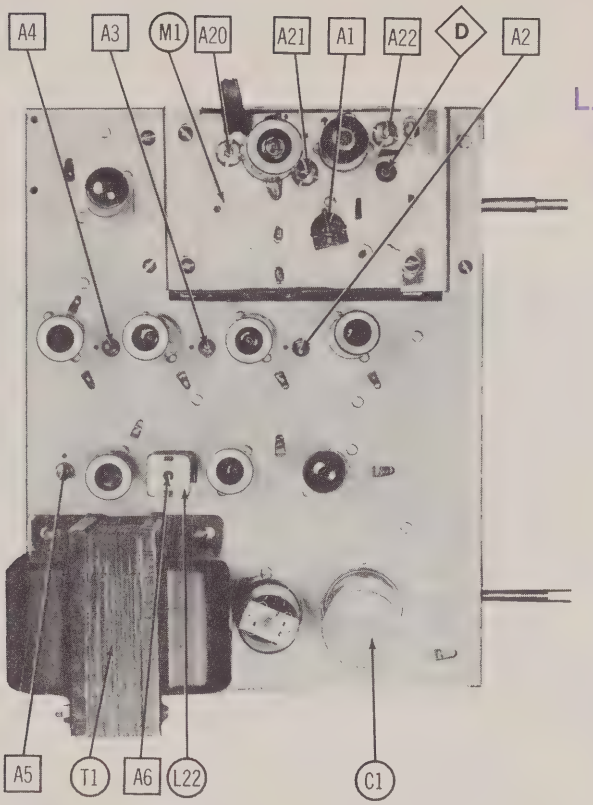
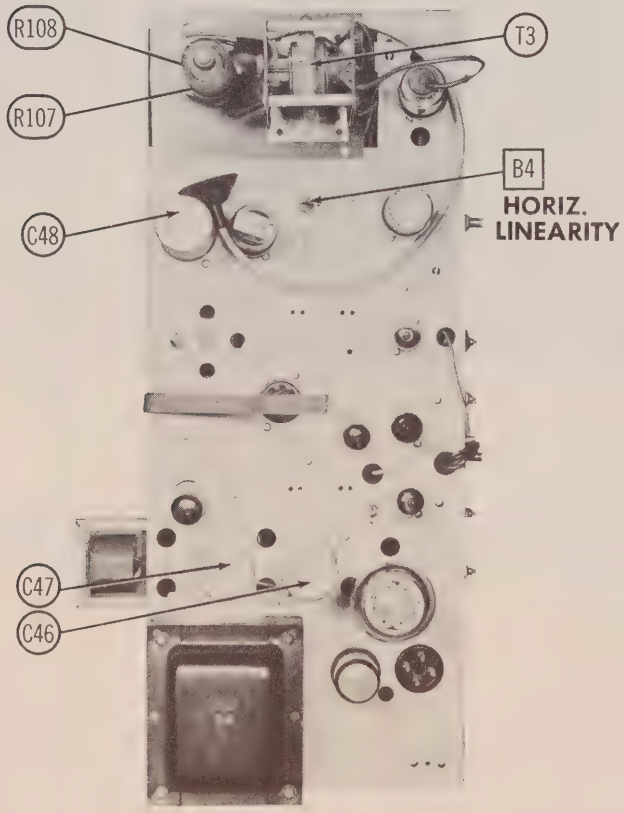
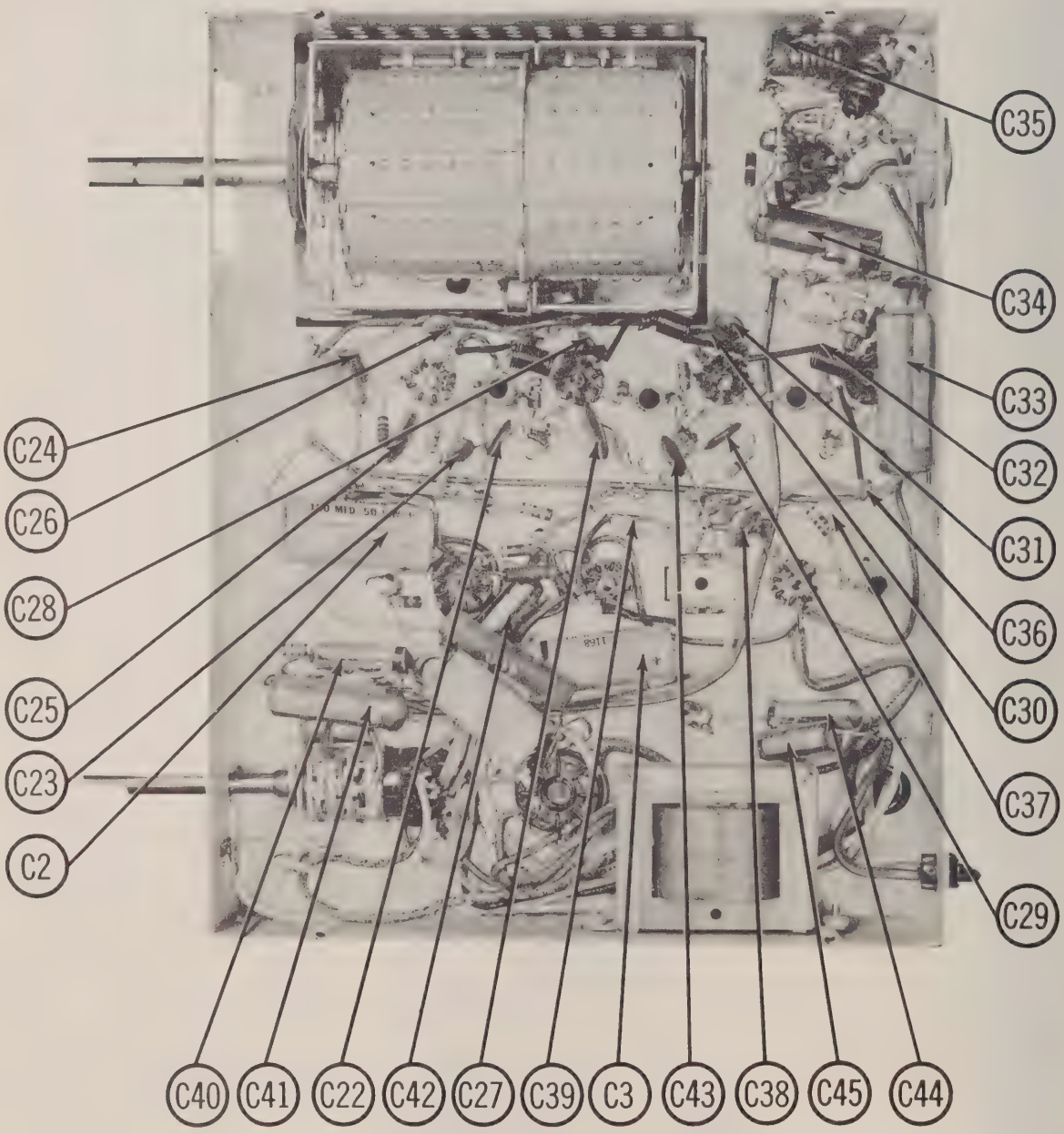


RF-IF CHASSIS-TOP VIEW

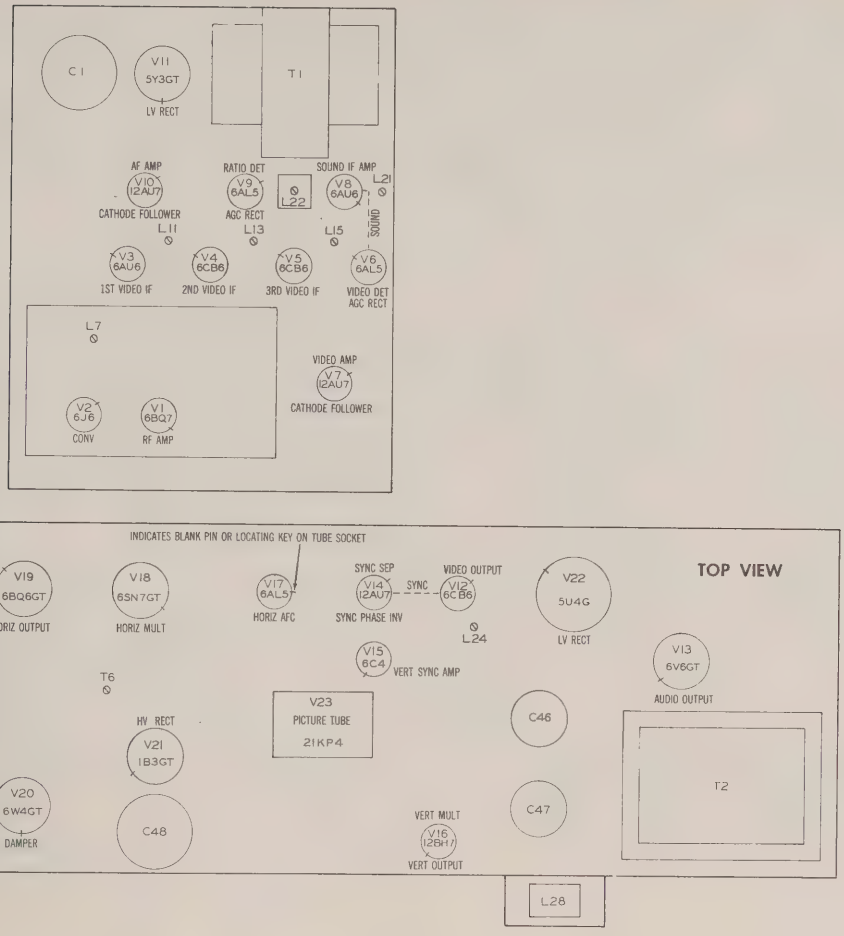


SWEEP CHASSIS-TOP VIEW



RF-IF CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V11, V22

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V7, V12, V23
Has pic, no sound - V8, V9, V10, V13
Overloaded picture - V6

SYNC FAILURE
No vert. sync - V14, V15, V16
No horiz. sync - V14, V17, V18
No vert. or horiz. sync - V14

SWEEP FAILURE
No raster, has sound - V18, V19, V20, V21, V23
No vertical deflection - V16
Poor vert. linearity or foldover - V16
Poor horiz. linearity or foldover - V18, V19, V20
Narrow picture - V18, V19, V20, V21, V22
Vert. off freq. - V14, V15, V16
Horiz. off freq. - V14, V17, V18

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the AC power plug from the deflection chassis.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	25.3MC (Unmod)	Any	DC probe thru 1Meg to point Ⓐ. Common to chassis.	A1	Adjust for maximum deflection. Attenuate generator output to maintain 1 volt at VTVM.
2.	"	"	23.0MC	"	"	A2	"
3.	"	"	25.3MC	"	"	A3	"
4.	"	"	23.0MC	"	"	A4	Adjust for maximum deflection. Repeat steps 1 thru 4 until no further increase in meter deflection is obtained.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.6MC 26.1MC	Any	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Check for response curve similar to Fig.1. If necessary, retouch A1 thru A4 to obtain desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point Ⓑ. Common to chassis.	A5, A6	Adjust for maximum deflection.
7.	"	"	"	"	DC probe to point Ⓒ. Common to chassis.	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.01MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point Ⓑ. Low side to chassis.	A5, A6	Disconnect stabilizing capacitor C4. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
7.	"	"	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A7	Reconnect stabilizing capacitor C6. Adjust so that 4.5MC occurs at center of cross-over lines as in Fig. 3. SLIGHTLY retouch A6 for maximum amplitude and straightness of crossover lines.

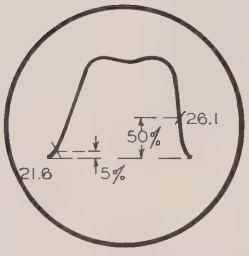


FIG. 1

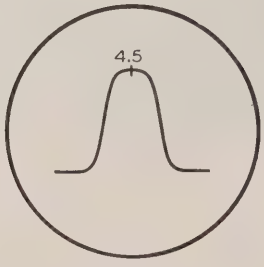


FIG. 2

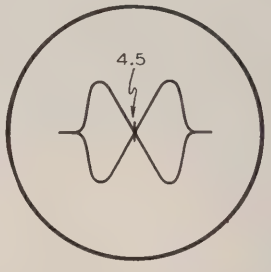


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The channel oscillator adjustment screws are reached thru a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A8	Adjust to place video marker at 50% on high frequency slope of response curve as in Fig. 4. Sound marker should not exceed 5%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A9	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A10	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A11	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A12	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A13	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A14	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A15	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A16	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A17	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A18	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A19	

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (D). Low side to chassis.	A20, A21, A22	Adjust for response curve similar to Fig. 5. with markers above 90%.
10.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"		If markers fall below 70% on any channel make compromise adjustments of A20, A21 and A22 with channel switch set to that channel, then recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

4.5MC TRAP ALIGNMENT

Tune in a TV station and adjust A23 for minimum 4.5MC beat interference.

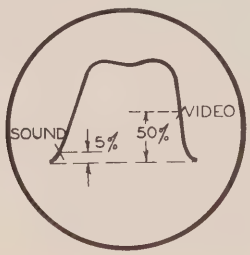


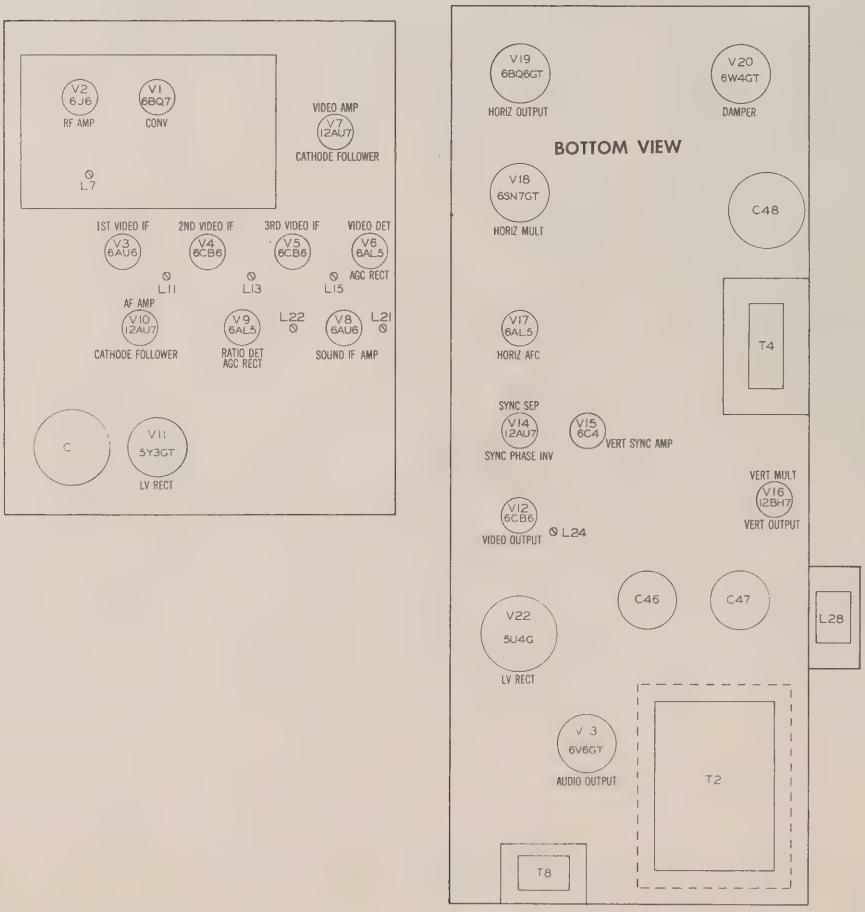
FIG. 4

FIG. 5

RESISTANCE MEASUREMENTS

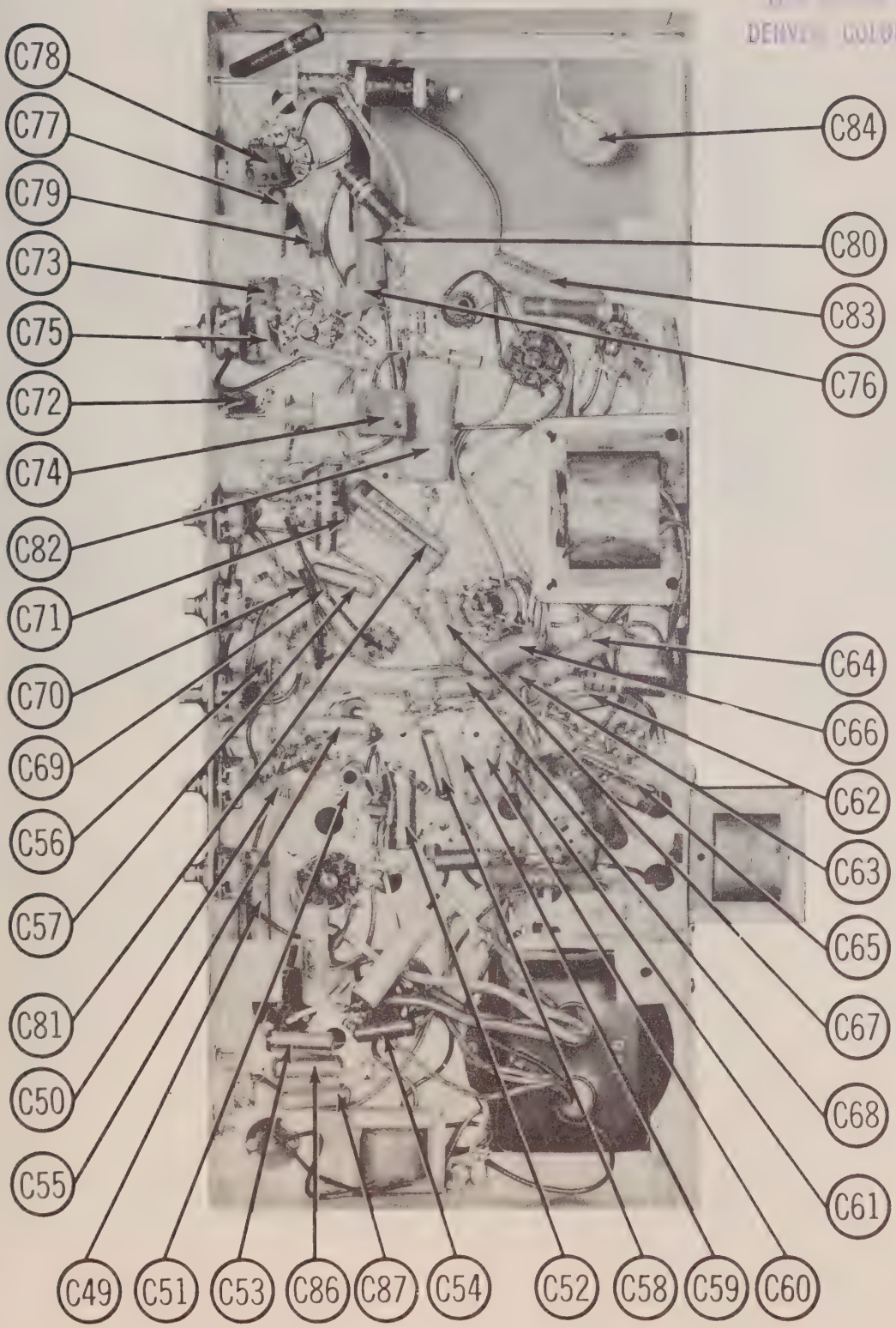
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7	INF	1.2Meg	0Ω	.1Ω	0Ω	†2KΩ	190KΩ	INF	0Ω
V 2	6J6	†17.5KΩ	†2.4KΩ	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6AU6	1.2Meg	0Ω	.1Ω	0Ω	†3KΩ	†3KΩ	47Ω		
V 4	6CB6	1.2Meg	68Ω	0Ω	.1Ω	†4.5KΩ	†4.5KΩ	0Ω		
V 5	6CB6	.4Ω	150Ω	0Ω	.1Ω	†3KΩ	†3KΩ	0Ω		
V 6	6AL5	4.7KΩ	680KΩ	0Ω	.1Ω	150Ω	0Ω	.4Ω		
V 7	12AU7	†6.5KΩ	1Meg	1.6KΩ	.1Ω	.1Ω	†2KΩ	1Meg	250Ω	0Ω
V 8	6AU6	470KΩ	0Ω	0Ω	.1Ω	†3KΩ	†3KΩ	82Ω		
V 9	6AL5	10KΩ	10KΩ	.1Ω	0Ω	INF	0Ω	INF		
V 10	12AU7	†100KΩ	700KΩ	1KΩ	.1Ω	.1Ω	†460Ω	1Meg	1.5KΩ	0Ω
V 11	5Y3GT	INF	150KΩ	INF	63Ω	INF	60Ω	†2KΩ	150KΩ	
V 12	6CB6	470KΩ	47Ω	.1Ω	0Ω	▲5.1KΩ	▲18.4KΩ	47Ω		
V 13	6V6GT	INF	0Ω	▲1.4KΩ	▲1KΩ	470KΩ	▲100Ω	.1Ω	360Ω	
V 14	12AU7	▲295KΩ	2.7Meg	0Ω	0Ω	0Ω	▲35KΩ	▲295KΩ	3.3KΩ	.1Ω
V 15	6C4	▲25KΩ	▲28KΩ	0Ω	.1Ω	▲25KΩ	1Meg	15KΩ		
V 16	12BH7	▲962Ω	1.5Meg	1KΩ	0Ω	0Ω	▲2.5Meg	1Meg	0Ω	.1Ω
V 17	6AL5	4.8Meg	4.8Meg	.1Ω	0Ω	12KΩ	0Ω	12KΩ		
V 18	6SN7GT	5.2Meg	■27KΩ	1.5KΩ	120KΩ	■170KΩ	1.5KΩ	.1Ω	0Ω	
V 19	6BQ6GT	INF	0Ω	INF	▲12.5KΩ	1.5Meg	INF	.1Ω	0Ω	TOP CAP ■41Ω
V 20	6W4GT	INF	INF	1Meg	INF	▲470Ω	INF	1Meg	1Meg	
V 21	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ■681Ω
V 22	5U4G	INF	150KΩ	▲5.1KΩ	35Ω	INF	38Ω	INF	150KΩ	
V 23	21KP4	.1Ω	▲180KΩ	PIN 6 ▲510Ω	PIN 10 ■150KΩ	PIN 11 ■400KΩ	PIN 12 0Ω			

† MEASURED FROM PIN 8 OF V11
▲ MEASURED FROM PIN 8 OF V22
■ MEASURED FROM PIN 3 OF V21

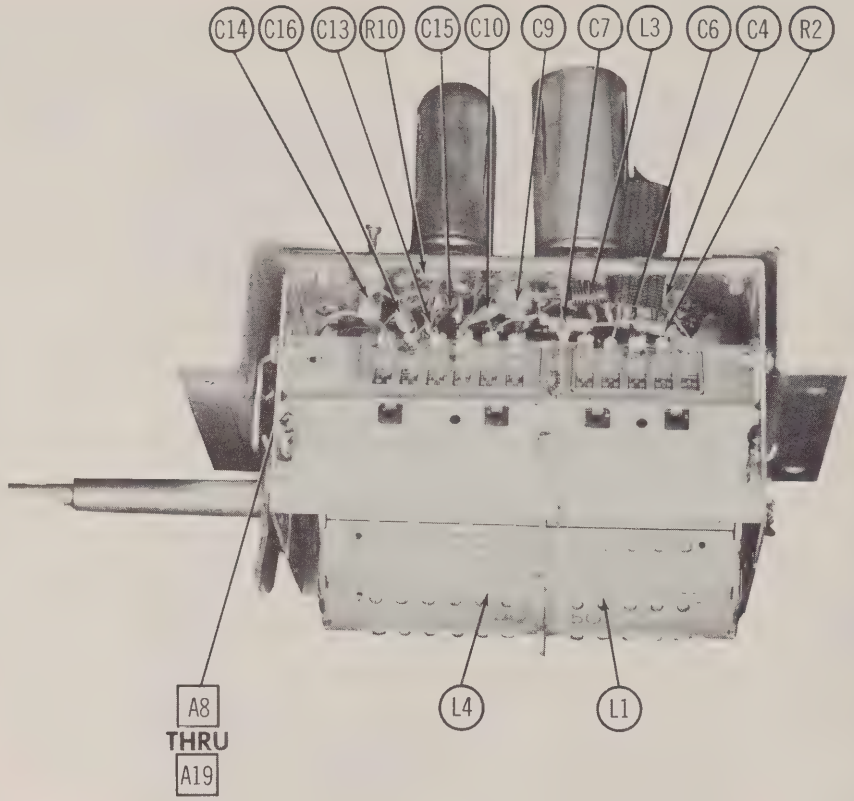


TUBE PLACEMENT CHART

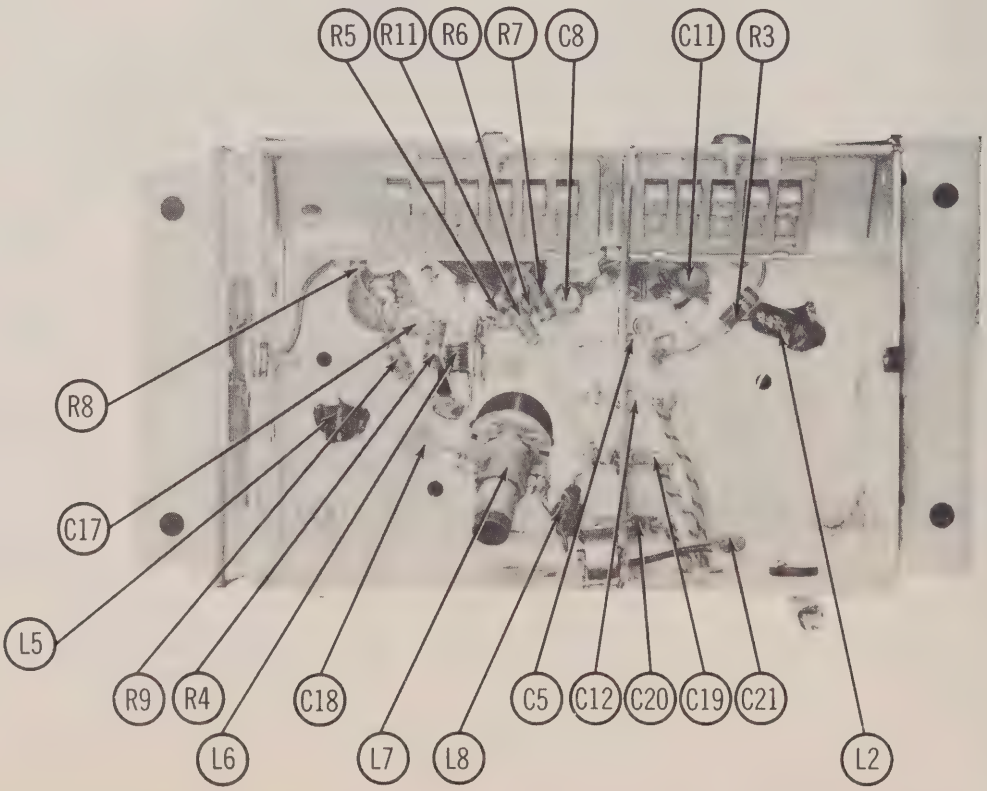
PROPERTY OF
L. F. WAKEFIELD
DENVER COLORADO



SWEEP CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

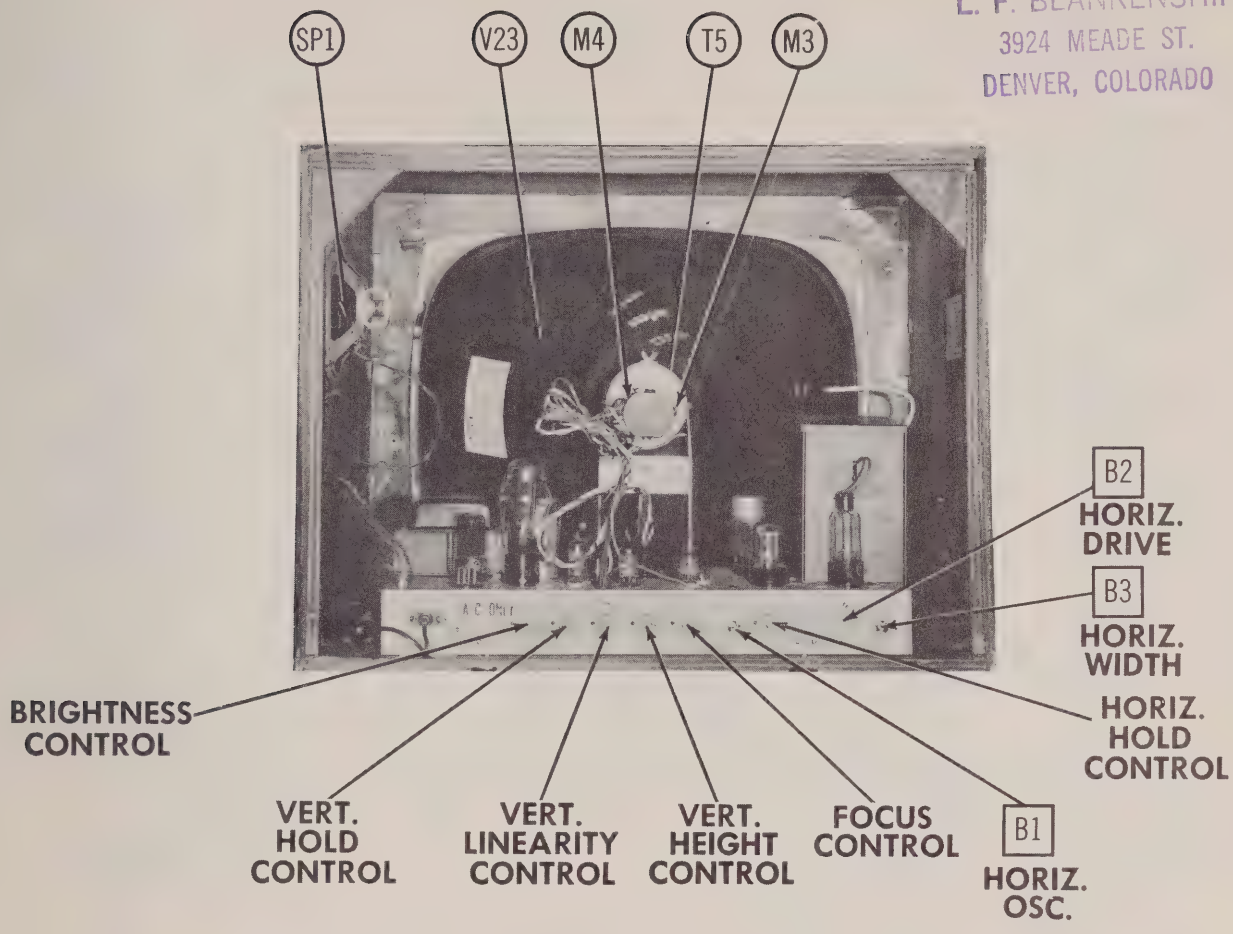


RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



GOTHAM MODEL 323

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position and adjust the horizontal oscillator slug (B1) until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer counter clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the horizontal width coil slug (B3) for a picture that is slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity coil slug (B4) for a picture that is symmetrical from left to right.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check adjustments B2, B3 and B4. Check by substitution V19, V20 and V22. Check T3, T5A, T6, T7, R103, R104 and other associated components.

DRIVE LINES

Check adjustments B2, B3 and B4. Check by substitution V19 and V20. Check C77, T3, T4A, T6 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V19 and V20. Check adjustments B2, B3 and B4. Check component associated with the horizontal output and damper stages for failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V18, V19 and V20. Check C73 for open and other associated components.

XMAS TREE EFFECT

Check by substitution V18, V19 and V20. Check C74, C75, C77, L27 and R95. Check T3 and T5A for internal arcing.

VERTICAL

LOSS OF SWEEP

Substitute V16. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R52, R83, C47D, C48A and other associated components.	Check R51, R84, C65, C63 and other associated components.

INSUFFICIENT SWEEP

Substitute V16. Check height and vertical linearity controls for proper operation. Check other components associated with V16.

COMPRESSED AT BOTTOM

Substitute V16. Check R51, R84, C65 and other associated components.

COMPRESSED AT TOP

Substitue V16. Check C47D, C48A, R52 and other associated components.

FOLDS

Substitute V16. Check T4, T5B, R81, C64 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V14 and V15. Check R59, R72, R71, R69, C55, C57 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V15 and V16. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check components associated with V16.	Check the vertical integrator network. Check C57, R74 and other associated components.

LOSS HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V17 and V18. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check L27, C74, C75, R49, R96 and other associated components.	Check C69, C72, R95, R93, R90, C70, R91 and other associated components.

HORIZONTAL BENDING

Check by substitution V12, V14, V15, V16, V17 and V18. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Check by substitution V7, V12. Check cables from RF-IF chassis. Check components associated with V7 and V12.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A23. Check video IF alignment.

POOR CONTRAST

Check by substitution V3, V4, V5, V6, V7 and V12. Check contrast control, picture tube and other associated components.

NEGATIVE PICTURE

Check by substitution V6, V7, and V12. Check picture tube. Check video detector network and other associated components.

SMEAR

Check by substitution V7 and V12. Check L17, L16, L18, L19, C49, L25, L26 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6, V7 and V12 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9, V10 and V13. Check stages V10 and V13 using audio signal generator. Apply audio signal across R1B.

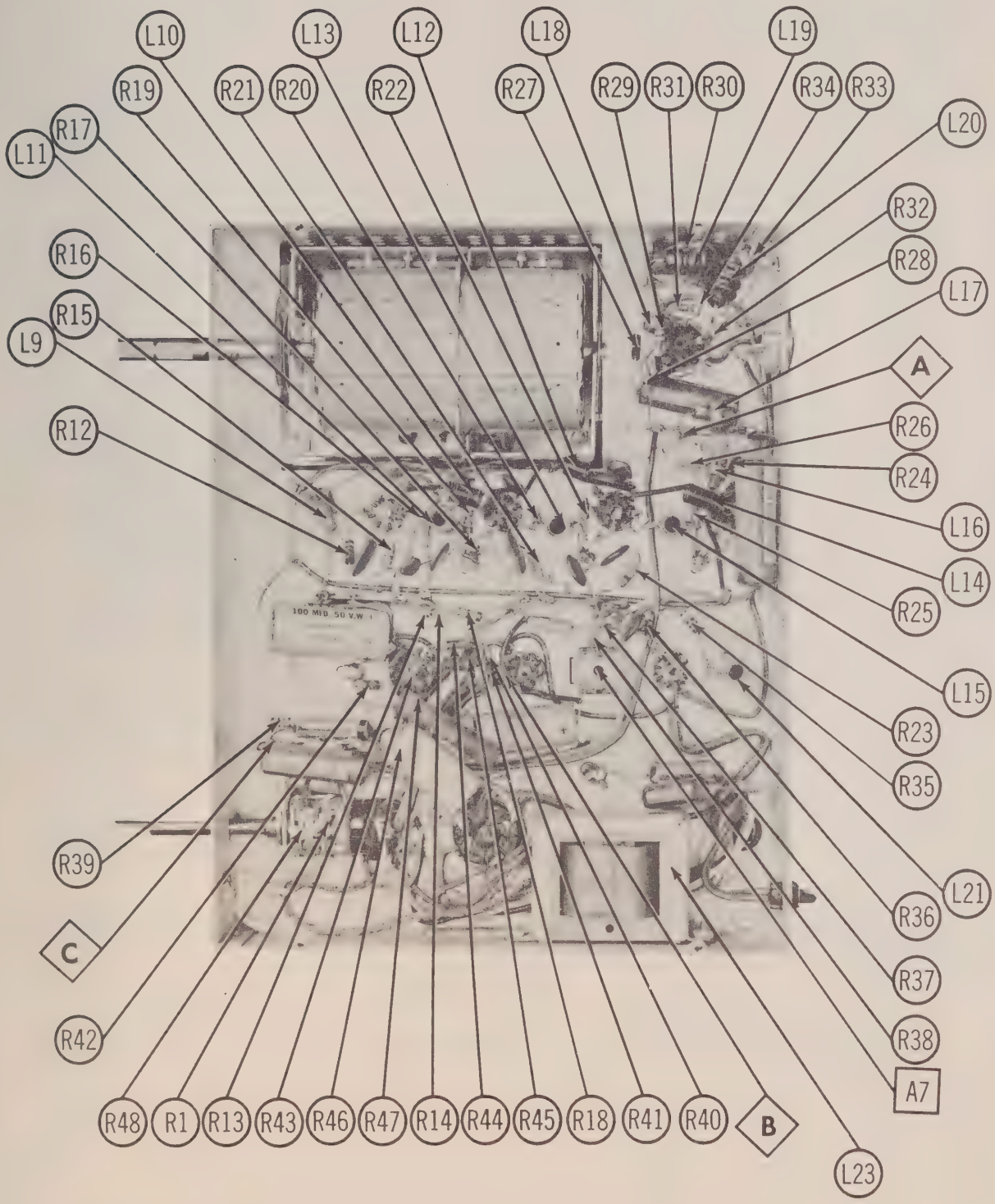
If Satisfactory	If Unsatisfactory
Check audio detector and audio IF stages for component failure or change of value.	Check C2, C53, C54, C46D, R66, R43, T8, speaker and other associated components. Check cable from RF-IF chassis.

BUZZ

Adjust tuner fine tuning for best sound and picture. Adjust A7 for minimum buzz. Check C3 and other associated components.

DISTROTED

Follow procedure outlined under "Weak or No Sound".



RF-IF CHASSIS-BOTTOM VIEW-RESISTOR, INDUCTOR AND ALIGNMENT IDENT.

PROPERTY OF
L. F. BLANKENSHIP

RF IF CHASSIS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA: GOTHAM PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BQ7	6BQ7	9AJ	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6AU6	6AU6	7BK	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	8CB6	6CB6	7CM	
V6	Video Detector - AGC Rectifier - Video Amp. - Cathode Follower	6AL5	6AL5	9BT	
V7	Sound IF Amp.	12AU7	12AU7	9A	
V8	Ratio Det.-	6AU6	6AU6	7BK	
V9	AGC Rectifier	6AL5	6AL5	9BT	
V10	AF Amp. - Cathode Follower	12AU7	12AU7	9A	
V11	LV Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	GOTHAM PART No	AEROVOX PART No	CENTRALAB PART No	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No	SPRAGUE PART No	NOTES
C1A	±20	375		AFH3-153		C100		FP391.1	TVL-3820	
B	±20	375								
C	±50	200								
C2	100	50		PRS50-100				TC3501	TVA-1310	
C3	1	50		PRS150, 4		BRH50I BR415		TC350	TVA-1303	
C4	3-9				829-10					
C5	900			EF-001	MFT-1000				503C-D1	
C6	3.3			S13.3NP0	TC2-3.3	Z008	NP0K-3R3	ZT-5533	5TCCB-V33	
C7	800			EF-001	MFT-1000				503C-D1	
C8	5-3				829-3		3U5-01-0R5	CT585A		
C9	1.5			S11.5NP0	TC2-1.5	Z004	NP0K-1R5	ZT-5515	5TCCB-V15	
C10	47			BPD-000047	D6-470	G033	801-470	UC-5447	5GA-Q47	
C11	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C12	800			EF-001	MFT-1000				503C-D1	
C13	47			BPD-000047	D6-470	G033	801-470	UC-5447	5GA-Q47	
C14	5-3				829-3		3U5-01-0R5	CT585A		
C15	10			S10NP0	TC2-10	Z018	NP0K-100 N50K-050	ZT-541 NT-555	5TCC-Q1	
C16	5			BPD-001	DD-102	N01L K069	801-001	DC-521	5HK-D1	
C17	1000			S16.8NP0	TC2-6.8	Z013	NP0K-6R8	ZT-5568	5TCC-Q68	
C18	6.8			EF-001	MFT-1000				503C-D1	
C19	800			EF-001	MFT-1000				503C-D1	
C20	800			BPD-0001Z	D6-121	G044	GP2K-121	UC-5312	5GA-T12	
C21	120			BPD-004	D6-402	K079	GP2-333-402	DC-524	5HK-D4	
C22	4000			BPD-004	D6-402	K071	801-0015	DC-5215	5HK-D15	
C23	1500			BPD-0015	DD-152					
C24	120	500			22R5T12					
C25A	2000			BPD-2X002	DD3-202	DX072	812-002	DCD-522	5HK-2D2	
B	2000									
C26	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C27A	2000			BPD-2X002	DD3-202	DX072	812-002	DCD-522	5HK-2D2	
B	2000									
C28	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C29	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C30	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C31	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C32	120			SU20	D6-121	TP35	GP2K-121	UC-5312	5GA-T12	
C33	.033	400		P468-22		CUB4P22		PT4022	47M-P22	
C34	.047	600		P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C35	.047	600		P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C36	4.7			S13NP0	TC2-4.7	Z010	NP0K-050	ZT-555	5TCCB-V47	
C37	20			SU20	D6-200	G023	801-020	UC-542	5GA-T2	
C38	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C39	470	500		1H5-0005		5R5T47		MCB245	MS-J5	
C40	.001	600		P688-001	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C41	.047	600		P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C42	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C43	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C44	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C45	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	

CONTROLS

ITEM No	RATING: RESISTANCE	RATING: WATTS	GOTHAM PART No	IRC PART No	CLAROSTAT PART No	CENTRALAB PART No	MALLORY PART No	INSTALLATION NOTES
R1A	5000Ω		VD5-4				UF53L	Contrast-Panel
B	1 Meg						UR16A	Volume-Rear
C	Switch						US-26	Attach to R1B

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATTS	GOTHAM PART No	IRC PART No.	NOTES
R2	15K Ω			BTS-15K	
R3	47KΩ			BTS-47K	
R4	160KΩ 5%			BTS-160K 5%	
R5	100KΩ			BTS-100K	
R6	100KΩ 5%			BTS-100K 5%	
R7	150ΩΩ			BTS-150Ω	
R8	10KΩ			BTS-10K	
R9	220KΩ			BTS-220K	
R10	100KΩ			BTS-100K	
R11	15KΩ			BTS 15K	
R12	2200Ω			BTS-2200	
R13	1000Ω			BTS-1000	
R14	1000Ω			BTS-1000	
R15	47Ω			BTS-47	
R16	10KΩ			BTS-10K	
R17	1000Ω			BTS-1000	
R18	470Ω			BTS-470	
R19	68Ω			BTS-68	

ITEM No.	RATING: OHMS	RATING: WATTS	GOTHAM PART No	IRC PART No.	NOTES
R20	560Ω			BTS-560	
R21	2700Ω			BTS-2700	
R22	150Ω			BTS-150	
R23	10Ω 5%			BTS-10 5%	
R24	560KΩ 5%			BTS-560K 5%	
R25	680KΩ			BTS-680K	
R26	4700Ω			BTS-4700	
R27	1 Meg			BTS-1 Meg	
R28	100Ω			BTS-100	
R29	33KΩ			BTS-33K	
R30	10KΩ			BTS-10K	
R31	1 Meg			BTS-1 Meg	
R32	100Ω			BTS-100	
R33	330Ω			BTS-330	
R34	4700Ω			BTS-4700	
R35	470KΩ			BTS-470K	
R36	82Ω			BTS-82	
R37	1000Ω			BTS-1000	

PARTS LIST AND DESCRIPTIONS

RESISTORS (cont)

ITEM No.	RATING: OHMS	RATING: WATTS	GOTHAM PART No	IRC PART No.	NOTES
R38	33KΩ	½		BTS 33K	
R39	47KΩ	½		BTS-47K	
R40	10KΩ	½		BTS-10K	
R41	10KΩ	½		BTS-10K	
R42	1000Ω	½		BTS-1000	
R43	100KΩ	½		BTS-100K	

ITEM No.	RATING: OHMS	RATING: WATTS	GOTHAM PART No	IRC PART No.	NOTES
R44	1 Meg	½		BTS-1 Meg	
R45	1500Ω	½		BTS-1500	
R46	150Ω	15			
R47	400Ω	10		1 3/4A-400	
R48	4700Ω	½		BTS-4700	

TRANSFORMER (POWER)

ITEM No.	RATING: PRI	RATING: SEC 1	RATING: SEC 2	GOTHAM PART No	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @.64A	580VCT @1.084ADC	5VAC @ 2A	TP-5						22R04U
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC @3.9A									

COILS (RF-IF)

ITEM No.	USE	DC RES: PRI	DC RES: SEC	GOTHAM PART No	MEISSNER PART No	MERIT PART No	MILLER PART No	NOTES
L1	Ant. Coils	0ΩCT	0Ω					
L2	Fil. Choke	0Ω						
L3	Neutr. Coil	0Ω						
L4	RF, Mixer grid & osc. coils	0Ω						
L5	Fil. Choke	0Ω						
L6	RF Choke	0Ω						
L7	1st Video IF	1.9Ω						
L8	RF Choke	1.1Ω						
L9	IF Trap	0Ω						
L10	Fil. Choke	0Ω						
L11	2nd Video IF	1.4Ω	1.4Ω		19-3001	TV-189	6175	8 Microhenries
L12	Fil. Choke	0Ω			17-1062	TV-116	6250	
L13	3rd Video IF	1.4Ω	1.4Ω		19-3001	TV-189	6175	8 Microhenries
L14	Fil. Choke	0Ω			17-1063	TV-116	6249	
L15	4th Video IF	1.4Ω	1.4Ω		19-3001	TV-189	6175	8 Microhenries
L16	Series Peak. Coil	10Ω			17-1064	TV-116	6250	
L17	Shunt Peaking Coil	11Ω			19-3180	TV-184	6180	180 Microhenries
L18	Series Peak. Coil	8Ω			19-3500	TV-188	6174	480 Microhenries
L19	Shunt Peaking Coil	31Ω			19-3300	TV-185	6155	300 Microhenries
L20	Series Peak. Coil	21Ω			19-3680		6850	850 Microhenries
L21	Sound IF	4.8Ω			17-3402	TV-151	4470	650 Microhenries
L22	Ratio Det.	5.5Ω	1.9ΩCT	LK-1	17-3497	TV-115	6205	Tertiary winding-.8Ω

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: DC RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT .000 ℄)	GOTHAM PART No	Stancor PART No	Merit PART No	Triad PART No	Halldorson PART No	Thordarson PART No
L23	.094ADC	62.8Ω	1.68 Hy	TF-4	C-2327 ①	C-2994 ①	C-21X	C5040 ↓	26C41 ↓

① Drill one new mounting hole.

MISCELLANEOUS

ITEM No.	PART NAME	GOTHAM PART No	NOTES
M1	Tuner	TV-2262	VHF

SWEEP CHASSIS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: GOTHAM PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V12	Video Output	6CB6	6CB6	7CM	
V13	Audio Output	6V6GT	6V6GT	7S	
V14	Sync Separator- Sync Phase Inverter	12AU7	12AU7	9A	
V15	Vert. Sync Amp.	8C4	8C4	6BG	
V16	Vert. Mult-Vert. Output	12BH7	12BH7	9A	
V17	Horiz. AFC	6AL5	6AL5	9BT	
V18	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V19	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V20	Damper	6W4GT	6W4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: GOTHAM PART No	CBS HYTRON PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No	WESTINGHOUSE PART No	RETMA BASE TYPE	NOTES
V23	21KP4					12L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING: CAP.	RATING: VOLT	GOTHAM PART No.	AEROVOX PART No	CENTRALAB PART No	CORNELL DUBILIER PART No.	ERIE PART No	MALLORY PART No	SPRAGUE PART No	NOTES
C46A	±25	450		AFH3-43		C034			TVL-3785	
B	±25	450		PRS50-50		BR505		TC339	TVA-1308	
C	±10	450								
D	50	50								
C47A	±25	450		AFH3-43		C034			TVL-3785	
B	±25	450		PRS50/50		BR505		TC339	TVA-1308	
C	±10	450								
D	50	50								
C48A	30	50		AFH4-108		D076		FP422.1	TVL-4701	
B	±20	450								
C	±20	200							MCB240	
D	±80	200								
C49	.1	600		P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C50	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C51	47			S14TNP0	TC2-47	TZ33	NP0K-470	ZT-5447	5TCC-Q47	
C52	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C53	.01	600		P688-0.	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C54	.005	600		P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C55	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C56	220	500		1469-00025		22R5T22		MCB240		
C57	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C58	.002	600		P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C59	470	500		1469-0005		5R5T47		MCB245	MS-J5	
C60	.002	600		P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C61	470	500		1469-0005		5R5T47		MCB245	MS-J5	
C62	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C63	.002	600		P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C64	.056	400				CUB4S6				
C65	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C66	.02	600		P688-02	DF-203	CUB6S2	817-02	PT612	6TM S2	
C67	.02	600		P688-02	DF-203	CUB6S2	817-02	PT612	6TM S2	
C68	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C69	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C70	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C71	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C72	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C73	.002	600		P688-02	DF-503	CUB6S2		PT612	6TM-S2	
C74	3900	500		1464-004		1R5T39		MCB245	MS-J4	
C75	330	500		1468-00035		3R5T33				
C76	220	500		1469-00022		22R5T22		MCB240		
C77	.001	1000		P688-001		CUB6D1		PT601	MB-D.	
C78	250	500		1469-00025		25R5T25		MCB240		
C79	220	500		1469-00015		22R5T22		MCB240		
C80	.047	600		P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C81	.22	400		P488-22		CUB4P22		PT4022	4TM-P22	
C82	.006	600		P684-06						
C83	.005	1000								
C84	500	20000		HV20C	TV3-502	MMU20T5	413	HV20035A	20DK-T5	
C85	56									
C86	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C87	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	

CONTROLS

ITEM No	RATING: RESISTANCE	RATING: WATTS	GOTHAM PART No	IRC PART No	CLAROSTAT PART No	CENTRALAB PART No	MALLORY PART No	INSTALLATION NOTES
R49A	50KΩ	1		PC-8	QII-123	A47 50K-S	AB-31	SU-35	Horiz Hold
B	Shaft			Not Req.	Not Req.	FKS-4	AK-1	Not Req.	Attach t. R49A
R50A	1 Meg	½		PC-7	QII-127	A47-1 Meg-B	AB-69	SU-54	Focus
B	Shaft			Not Req.	Not Req.	FKS-4/4	AK-1	Not Req.	Attach to R50A
R51A	1 Meg	1		PC-7	QII-137	A47 1 Meg-S	AB 69	SU-54	Height
B	Shaft			Not Req.	Not Req.	FKS-4	AK 1	Not Req.	Attach to R5A
R52A	20000Ω	1		PC-2	QII-110	A47 2000-S	AB-6	U-6	Vert. Linearity
B	Shaft			Not Req.	Not Req.	FKS-4	AK-1	Not Req.	Attach t. R52A
R53A	1 Meg	1		PC-7	QII-137	A47-1 Meg-S	AB-69	SU-54	Vert. Hold
B	Shaft			Not Req.	Not Req.	FKS-4	AK-1	Not Req.	Attach t. R53A
R54A	1 Meg	1		PC-7	QII-137	A47 1 Meg-S	AB-69	SU-54	Brightness
B	Shaft			Not Req.	Not Req.	FKS-4	AK-1	Not Req.	Attach to R54A

RESISTORS (cont)

ITEM No	RATING: OHMS	RATING: WATTS	GOTHAM PART No	IRC PART No	NOTES
R55	150Ω			BTS 150	
R56	470KΩ			BTS-470A	
R57	470Ω			BTS-47	
R58	47000Ω				
R59	22KΩ			BTS 22K	
R60	680KΩ			BTS-680K	
R61	560KΩ			BTS-560K	
R62	100KΩ			BTS 100K	
R63	68000Ω			BTA 6800	
R64	470KΩ			BTS-470K	
R65	360Ω			BTS 360	
R66	5600Ω				
R67	2.2 Meg			BTS 2.2Meg	
R68	470KΩ			BTS 470K	
R69	270KΩ			BTS-270K	
R70	3300Ω			BTS 3300	
R71	6800Ω			BTS-6800	
R72	3300Ω			BTS-3300	
R73	1 Meg			BTS 1 Meg	
R74	15KΩ			BTS 15K	
R75	8200Ω			BTS 8200	
R76	2200Ω			BTS-R200	
R77	47KΩ			BTS 47K	
R78	47KΩ			BTS 47K	
R79	100KΩ			BTS-100K	
R80	470KΩ			BTS-470K	
R81	8200Ω			BTS-8200	
R82	1.5Meg			BTS-1.5Meg	
R83	100Ω			BTS-100	

ITEM No.	RATING: OHMS	RATING: WATTS	GOTHAM PART No	IRC PART No.	NOTES
R84	470KΩ			BTS-470K	
R85	2.2Meg			BTS-2.2Meg	
R86	1500Ω			BTS-1500	
R87	15KΩ			BTS 15K	
R88	560Ω			BTS-560	
R89	560Ω			BTS-560	
R90	100KΩ			BTS-100K	
R91	100KΩ			BTS-100K	
R92	12KΩ	2		BTB 12K	
R93	470KΩ			BTS-470K	
R94	4.7Meg			BTS 4.7Meg	
R95	1500Ω			BTA 1500	
R96	6800Ω			BTA-6800	
R97	100KΩ			BTS-100K	
R98	150KΩ			BTS-150K	
R99	3.3Ω			BTS-3.3	
R100	1.5 Meg			BTS-1.5Meg	
R101	82Ω			BTS-82	
R102	10Ω	2		BTB-10	
R103	12KΩ	2		BTB-12K	
R104	20KΩ	2		BTB-20K	
R105	1 Meg	2		BTS 1 Meg	
R106	50KΩ	2		BTB-50K	
R107	3.3Ω	2			
R108	680KΩ	10		BTA-680K	
R109	100Ω	10		1 3/4A-100	
R110	100Ω	10		1 3/4A-100	
R111	100Ω	10		1 3/4A-100	
R112	100Ω	10		1 3/4A-100	
R113	18KΩ	2		BTB-18K	

GOTHAM
MODEL 323

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	GOTHAM PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T2	117VAC @1.48A	716VCT .180ADC	5VAC @3A	TP-4	P-8163 ①	P-3078 ②	R-37BC		P9705 ①	26R17
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC @1.2A	6.3VAC @4.7A								

① Drill new mounting hole.
② Tape 6.3V @ 2.7A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA						
		GOTHAM PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T3	Horiz. Output Trans.	TH-2	A-8130 *	HV0-7*①	D-32*①		FB401 *	FLY-5*①
T4	Vert. Output Trans.	TV-3	A-8143 ②	A-3038 ②	A-99X ②	204T2 ①⑥	Z1802 ②	26S53 ②
T5A B	Yoke-Horiz. (14MH) Vert. (48MH)	DY-6	DY-9A	MDF-72	Y-17-1	21ID2	DF602	Y-7
T6	Horiz. Linearity (3.5-29MH)	LM77J4	WC-5③	MWC-1③	WC-11③	215R1⑦	RF800④	WC-13⑤
T7	Width (3.7-31.5MH) (3-8.5MH)	M77J4-3	WC-5	MWC-1	WC-11	214R1⑦	RF800	WC-20

① Drill new mounting holes.
② Drill one new mounting hole.
③ Connect to coded red and blue terminals.
④ Connect to terminals #1 and #2.
⑤ Connect to terminals #3 and #4.
⑥ Mount on top of chassis.
⑦ Drill new mounting hole.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordarson Replacement Connections
	3	3	3	3		3	3
	2	2	2	2		2	2
	1	1	1	1		1	1
	4	4	4	4		4	4
	5	5	5	5		5	5
	8	8	8	8		8	8
	6	6	6	6		6	6
Connect Width Coil Across ➡	5 & 8	5 & 8	5 & 8	5 & 8		5 & 8	5 & 8

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	GOTHAM PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T8	4.7KΩ	3.8Ω	TA-4	A-3877	A-2930	S-3X	Z1000	24S51	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	GOTHAM PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6"	PM	3.8Ω	6AM6	ST-108 Mod. P6-X	6A1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	GOTHAM PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L24	4.5MC Trap	1.9Ω			20-1004	TV-151	1469	
L25	Series Peak. Coil	8.5Ω			19-3300 †	TV-185 †	6155†	300 Microhenries; wound on 33KΩ resistor
L26	Shunt Peak. Coil	12Ω			19-4412	TV-188 *	4648 *	420 Microhenries; wound on 10KΩ resistor
L27	Horiz. Osc.	36Ω		403	19-1576	TV-163	6210	

† Parallel with 33KΩ resistor.
* Parallel with 10KΩ resistor.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	GOTHAM PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L28	.180ADC	62.8Ω	1.68 Hy.	TF-4	C-2327①	C-2994 ①	C-21X	C5040 ①	26C41 ①

① Drill one new mounting hole.

MISCELLANEOUS

ITEM No.	PART NAME	GOTHAM PART No.	NOTES
M2	Relay		Power switch; slave unit
M3	Centering magnet		
M4	Ion trap		
B2	Trimmer cap.		25-280 MMF; Horiz. drive

TROUBLE SHOOTING AIDS (cont)

POWER

DEAD SET

If filaments fail to light, in Sweep Chassis, check AC interlock , M2 and T1. If filaments fail to light in RF-IF chassis and Sweep Chassis, Check AC interlock in RF-IF chassis, check switch on volume control. Check T2. If filaments light, check by substitution V11 and V22. Check T1 and T2. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Check by substitution V22. Check B+ filter and decoupling network in sweep chassis.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V18, V19, V20, V21 and V22. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check T3, T5A, T6, T7, C82, C83, C80, C79, R103, and other associated components.	Check C77, C75, C74, C48B, R96, R98, L27, R95 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V19, V20, V21 and V22. Check adjustments B2, B3, and B4. Check T3, T5A and other components associated with the horizontal output stage.

BLOOMING

Check by substitution V19, V20, V21 and V22. Check T3, T5A and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V3, V4, V5, V6, V7 and V11. Check components associated with the video IF stages.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at time, thru the small hole in the cabinet to the right of channel selector shaft.

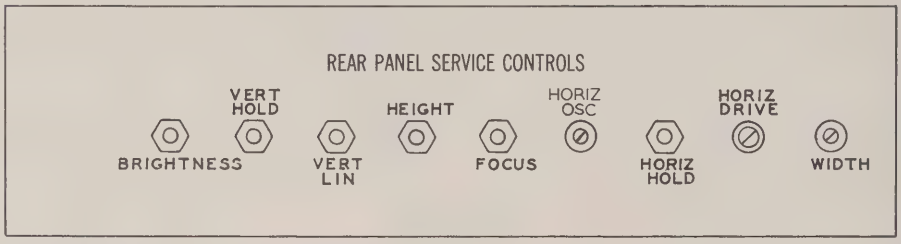
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal oscillator slug (L27) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L22) located on bottom of chassis. (See tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

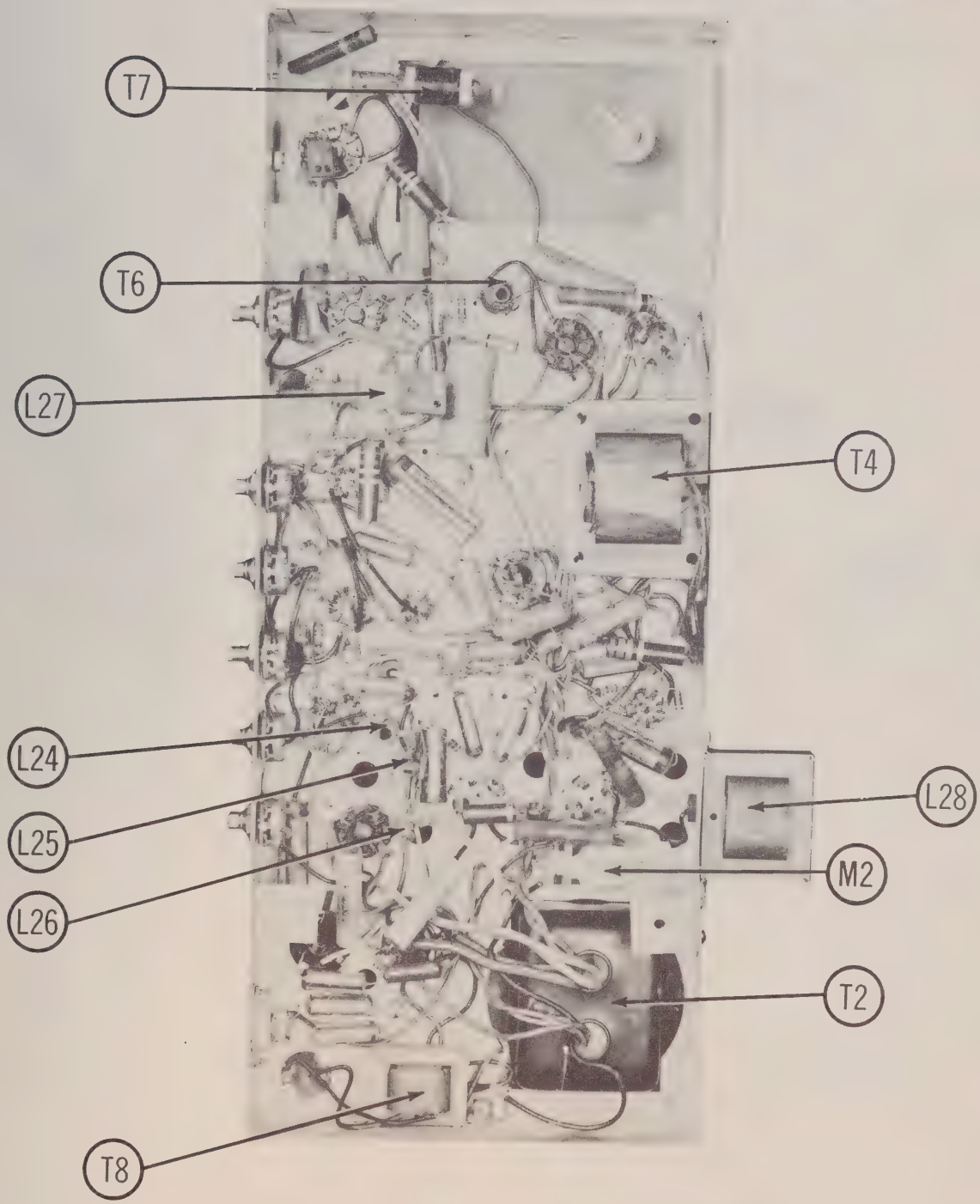
REMOTE UNIT

Remove 4 push-on type control knobs.
Remove 2 wood screws. Remove cover.
Remove 4 chassis bolts.
Remove RF-IF Chassis

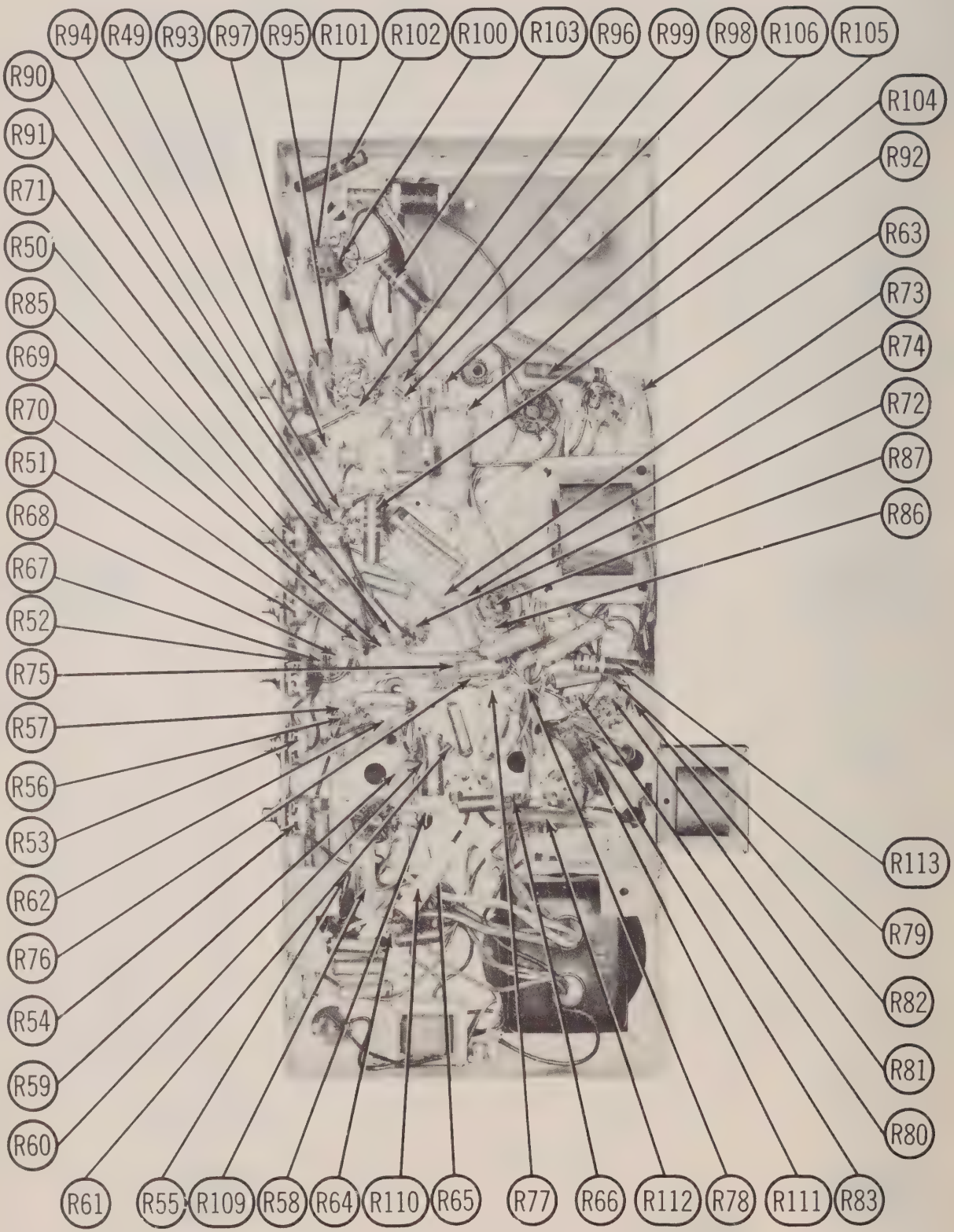
MAIN CABINET

Remove 7 wood screws. Remove rear cover.
Disconnect speaker plug.
Remove 4 speaker nuts. Remove speaker.
Remove 4 chassis bolts. Remove sweep chassis.
Note- Picture tube is mounted in cabinet, but it is advisable to remove tube when removing chassis.
Unplug picture tube socket and H. V. lead.
Remove Ion trap, and focus assembly from neck of picture tube .
Remove sweep chassis.
Remove wing nut on front tube bracket.
Remove picture tube.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



SWEEP CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENT



SWEEP CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. [illegible]
[illegible] ST.
DENVER, COLORADO

GRANCO
MODEL LCU (UHF Conv.)

GRANCO
MODEL LCU (UHF Conv.)

TRADE NAME	Granco Model LCU	
MANUFACTURER	Granco Products Inc., 36-17 20th. Ave., Long Island City 5, N.Y.	
TYPE SET	AC Operated All Channel UHF Converter	
TUBES (Two)	Types 6AF4 Osc., 6CB6 IF Amplifier	
POWER SUPPLY	110-120 Volts AC	RATING .1 8 Amp. @ 117 Volts AC
TUNING RANGE -	Channels 14 thru 83	

THE UHF CONVERTER UNIT HAS BEEN PROPERLY ALIGNED AT THE FACTORY AND IS VERY STABLE. IF MAJOR REPAIR OR ALIGNMENT BECOMES NECESSARY THE ENTIRE UNIT SHOULD BE RETURNED TO THE FACTORY.

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PARTS LIST AND DESCRIPTIONS

GRANCO MODEL LCU

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		GRANCO PART No.	STANDARD REPLACEMENT		
V1	UHF Oscillator	6AF4	6AF4	7DK	
V2	UHF IF Amplifier	6CB6	6CB6	7CM	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	GRANCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■30	150		AFH2-11		B011		FP211	TVL-2422	
B	▲30	150								
C2	650									
C3	470			BPD-00047	DD-471	K060	801-470	UC-5347	5GA-T47	
C4	470			BPD-00047	DD-471	K060	801-470	UC-5347	5GA-T47	

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	GRANCO PART No.	IRC PART No.	
R1	120Ω	½		BTS-120	
R2	330Ω	½		BTS-330	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	GRANCO PART No.	IRC PART No.	
R3	390Ω	1		BTA-390	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	GRANCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @.18A	125VAC .028ADC	6.3VAC @.58A				P-3046①			

① Drill one new mounting hole.

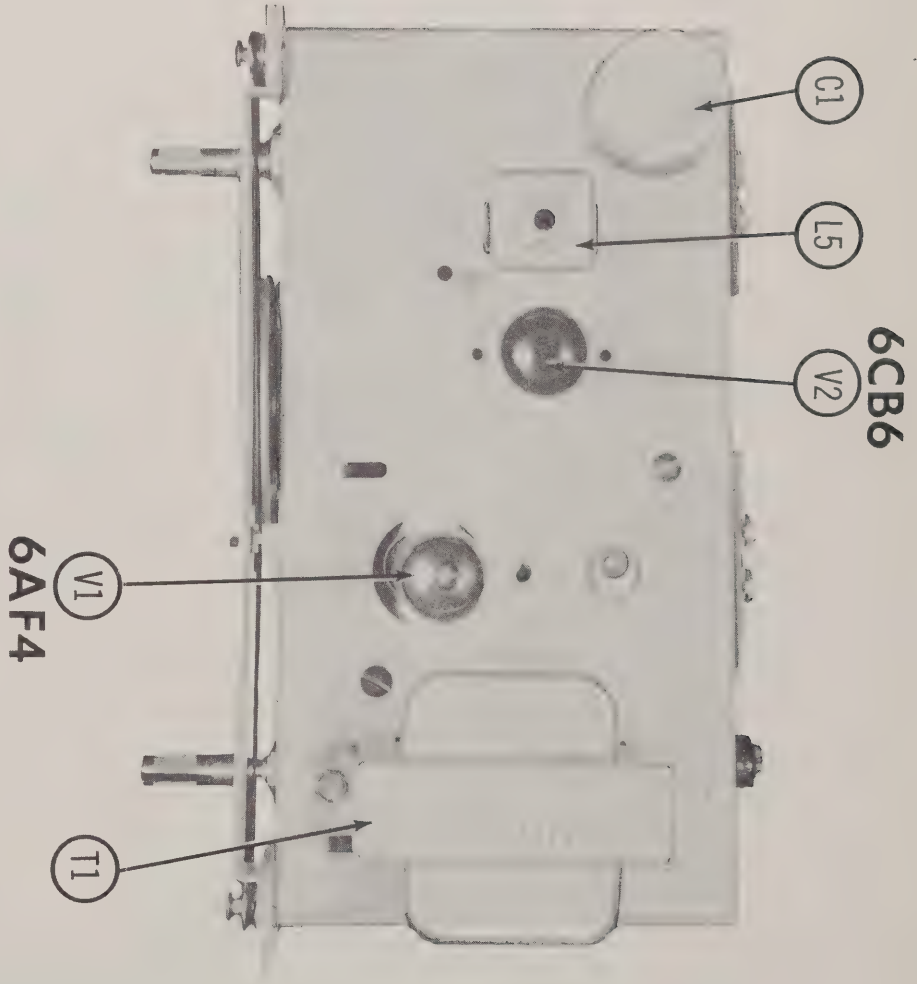
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	GRANCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Fil. Choke	0Ω						
L2	Fil. Choke	0Ω						
L3	IF Coupling	0Ω						
L4	RF Choke	.2Ω						
L5	UHF IF Output Coil	0Ω	0Ω					Includes capacitors

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	GRANCO PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.028ADC		1263A ①	CR30 ②	35	6S35	8J1 ①	① Drill one mounting hole. ② Different mounting

CHASSIS—TOP VIEW



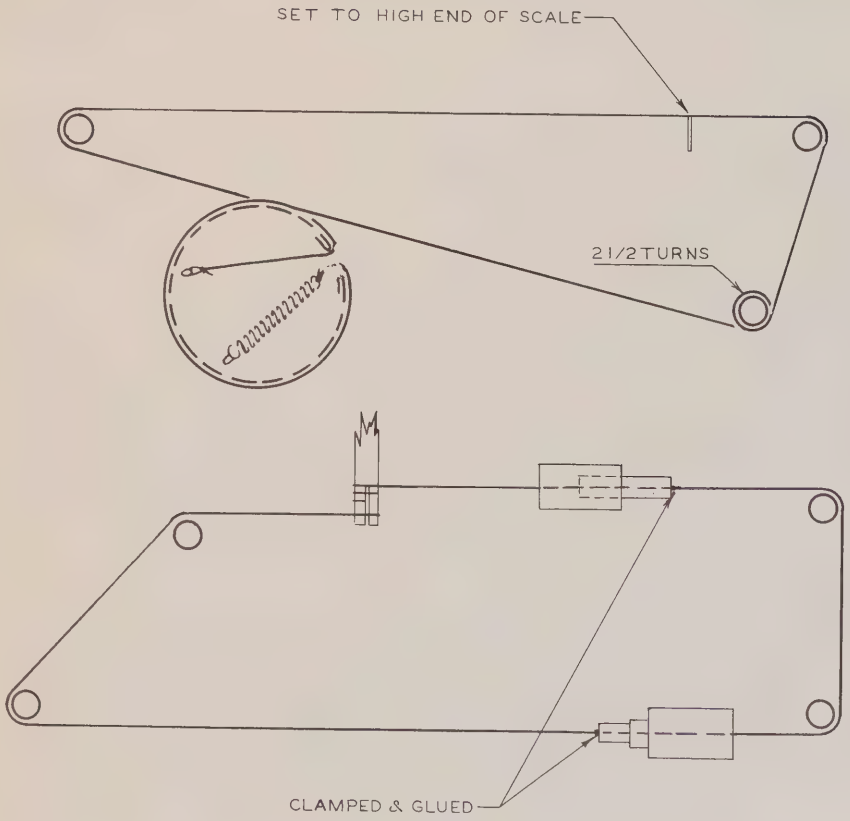
PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		GRANCO PART No.	SYLVANIA PART No.	FEDERAL PART No.	
M2	G7A		1N82 or 1N82A		UHF Mixer

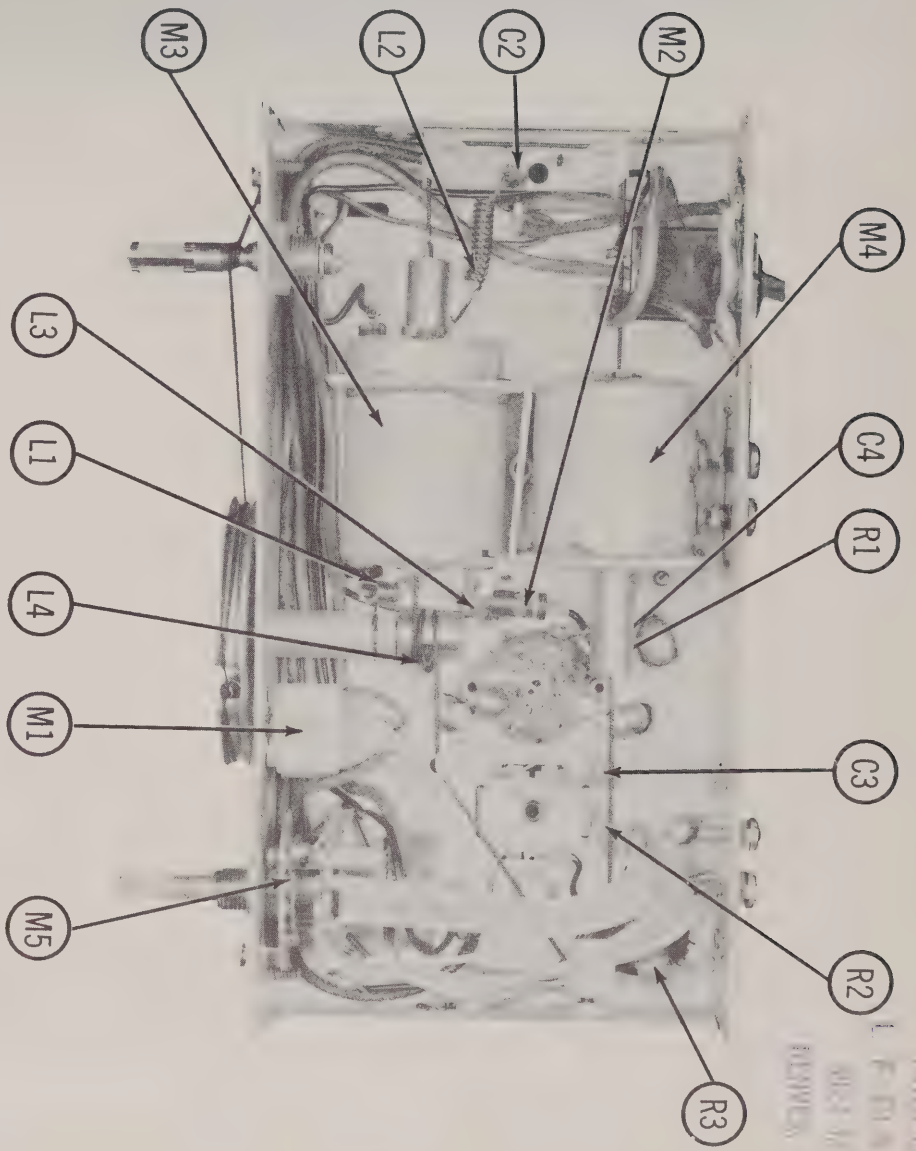
MISCELLANEOUS

ITEM No.	PART NAME	GRANCO PART No.	NOTES
M3	Tuning Cavity		Oscillator
M4	Tuning Cavity		Antenna
M5	Switch		Band off/on



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



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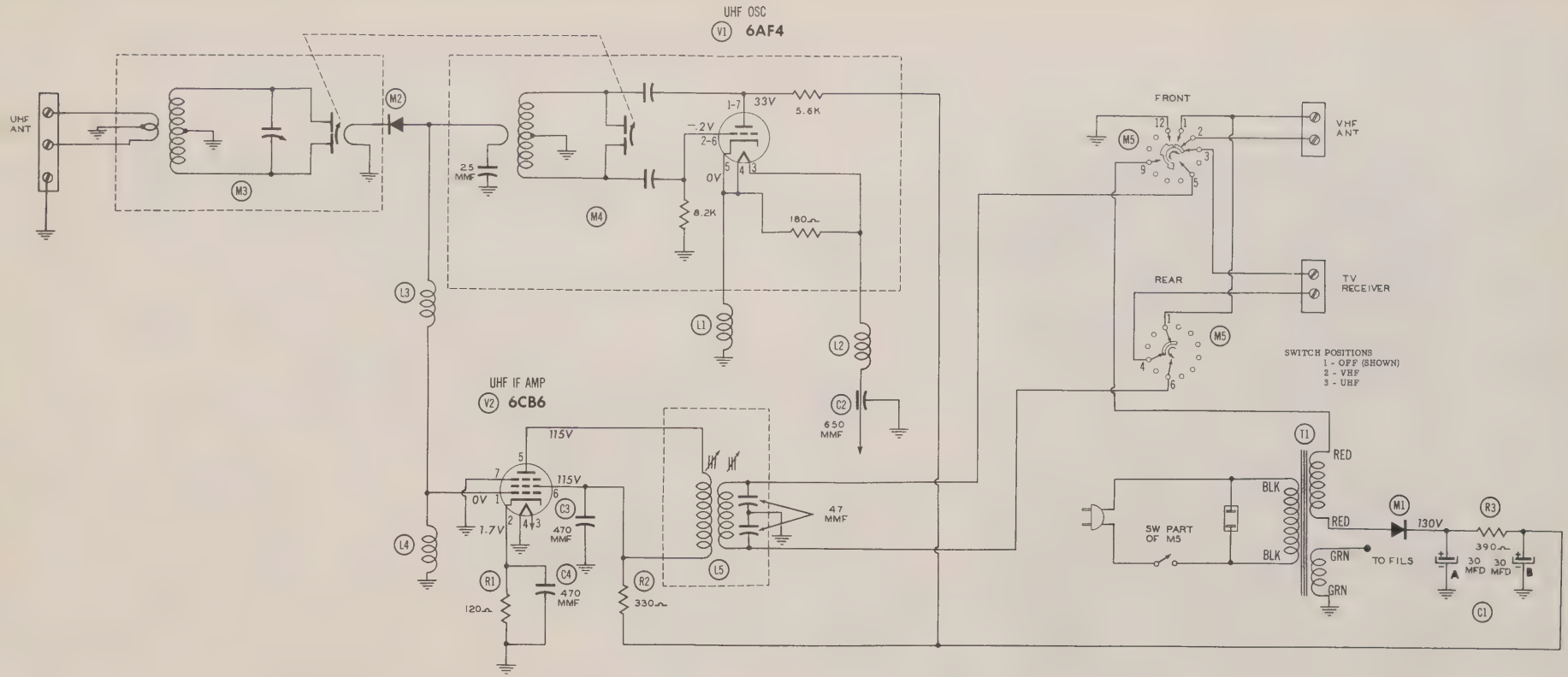
GRANCO MODEL LCU

GRANCO MODEL LCU



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6AF4	†6KΩ	8.2KΩ	.1Ω	0Ω	0Ω	8.2KΩ	†6KΩ
V 2	6CB6	.2Ω	120Ω	.1Ω	0Ω	†720Ω	†720Ω	0Ω

† MEASURED FROM OUTPUT OF M1

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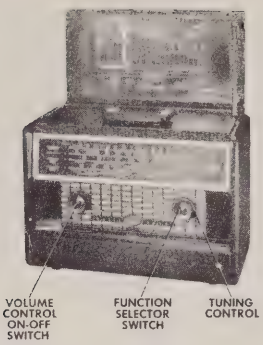

TRADE NAME	Hallicrafters Models TW-500, TW-600 (Runs 1 and 2)
MANUFACTURER	Hallicrafters Co., 4401 W. 5th. Ave., Chicago 24, Ill.
TYPE SET	Three Power Portable 4 Band AM Superheterodyne Receiver
TUBES (Five)	Types 1U4 RF Amp., 1L6 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Audio Output
POWER SUPPLY	105-120 Volts AC-DC (or) 9 Volts "A" Supply & 90 Volts "B" Supply in Pack Form
RATINGS	.13 Amp. @ 117 Volts AC (or) 70MA @ 9 Volts DC & 17MA @ 90 Volts DC
TUNING RANGE	Band #1 (170-415KC), Band #2 (530-1620KC), Band #3 (2.0-6.0MC), Band #4 (6.0-18.0MC)

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Allow a 15 minute warm-up period for receiver and test equipment.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.
Disconnect the short wave whip antenna.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to stator lug on center section of tuning gang. Low side to B-.	455KC (400~Mod)	Band 2	1000KC	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	360KC	Band 1	360KC	"	A5, A6, A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	200KC	"	200KC	"	A8, A9, A10	Adjust for maximum output. Repeat step 2.
4.		"	1400KC	Band 2	1400KC	"	A11, A12, A13	Adjust for maximum output.
5.		"	600KC	"	600KC	"	A14, A15, A16	"
6.	Fig. 1	Thru dummy (Fig.1) across antenna terminals.	5.0MC	Band 3	5.0MC	"	A17, A18, A19	"
7.	"	"	2.2MC	"	2.2MC	"	A20, A21 A22	"
8.	Fig.2	Thru dummy (Fig.2) across antenna terminals.	14.0MC	Band 4	14.0MC	"	A23, A24 A25	"
9.	"	"	7.0MC	"	7.0MC	"	A26, A27 A28	"

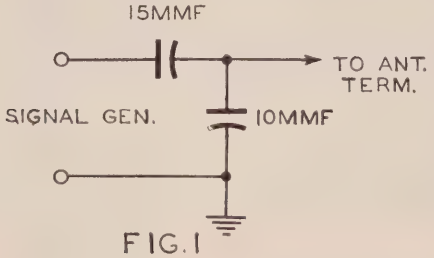

FIG.1

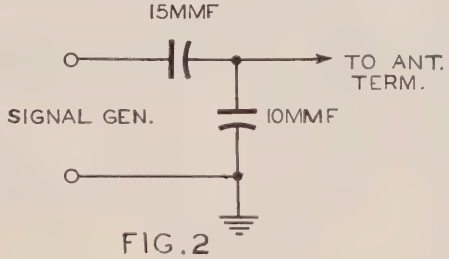

FIG.2

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HALLICRAFTERS MODELS
TW-500, TW-600 (Runs 1 & 2)

HALLICRAFTERS MODELS
TW-500, TW-600 (Runs 1 & 2)

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Hallicrafters PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	1U4	1U4	6AR	
V2	Converter	1L6	1L6	7DC	
V3	IF Amplifier	1U4	1U4	6AR	
V4	Det.-AF-Amplifier	1U5	1U5	6BW	
V5	Audio Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: Hallicrafters PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	150	45B251	AFH4-124		D001		FP408	TVL-3583	Note 1
B	■40	150		PRS12/250		BRH122		TC48	TVA-1131	Note 1
C	▲40	150								Note 1
D	200	10								Note 1
C2	100	25	45B214	PRS25/100		BR10015		TC2501	TVA-1207	
C3	.047	200	46BS473L2	P288-047	DF-503	PJ2S47		PT4147	2TM-S47	
C4	22		47X20CG220K	SI22NP0	TCZ-22	TZ14	NP0K-220		5TCC-Q22	
C5	22		47X20CG220K	SI22NP0	TCZ-22	TZ14	NP0K-220		5TCC-Q22	
C6	6.8		48X20CG068K1D	SI6.8NP0	TCZ-6.8	TZ08	NP0K-6R8	ZT-5568	5TCCB-V68	
C7	270		47CA20A271K	SI270	D6-271	TP41	GP1K-271	UC-5327	5GA-270	
C8	.047	200	46BS473L2	P288-047	DF-503	PJ2S47		PT4147	2TM-S47	
C9	20000		47A242	BPD-02	DD-203	K084		DC-512	5HK-S2	
C10	20000		47A242	BPD-02	DD-203	K084		DC-512	5HK-S2	
C11	.047	200	46BS473L2	P288-047	DF-503	PJ2S47		PT4147	2TM-S47	
C12	39		47X30CG390J/D	SI39NP0	TCZ-39	TZ20	NP0K-390		5TCC-Q39	
C13	270		47CA20A271K	SI270	D6-271	TP41	GP1K-271	UC-5327	5GA-T27	
C14	270		47CA20A271K	SI270	D6-271	TP41	GP1K-271	UC-5327	5GA-T27	
C15	270		47CA20A271K	SI270	D6-271	TP41	GP1K-271	UC-5327	5GA-T27	
C16	570		47X20C571G							
C17	1650		47A445							
C18	3150		47B446							
C19	300		47X20C301G							
C20	120		47X30UK121J/D							
C21	20000		47A242	BPD-02	DD-203	K084		DC-512	5HK-S2	
C22	.047	200	46BS473L2	P288-047	DF-503	PJ2S47		PT4147	2TM-S47	
C23	.047	200	46BS473L2	P288-047	DF-503	PJ2S47		PT4147	2TM-S47	
C24	1000		47C20A102N	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C25	20000		47A242	BPD-02	DD-202	K084		DC-512	5HK-S2	
C26A	50		♦	♦PA-99	♦PC-52	♦111TM3	♦1403-03	UC-545	♦D-3	
B	50							UC-545		
C27	5000		47A168	BPD-005	DD-502	K082	801-005	DC-525	5HK-D5	
C28A	100		*	*PA-117	*PC-91	*114TM2	*1407-03	UC-531	*P-2	
B	5000							DC-525		
C	5000							DC-525		
C29	220		47CA20A221K	SI220	D6-221	TP39	GP1K-221	UC-5322	5GA-T22	
C30	.0047	600	46BS472L6	P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C31	.047	600	46BR473L6	P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C32	.047	600	46BR473L6	P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C33	.047	200	46BS473L2	P288-047	DF-503	CUB2S47		PT4147	2TM-S47	

Note 1. Items C1A, C1B and C1D are used on Run 2 Set.
Run 1 sets use a 40-40MFD @ 150V, 80MFD @ 25V in this application.

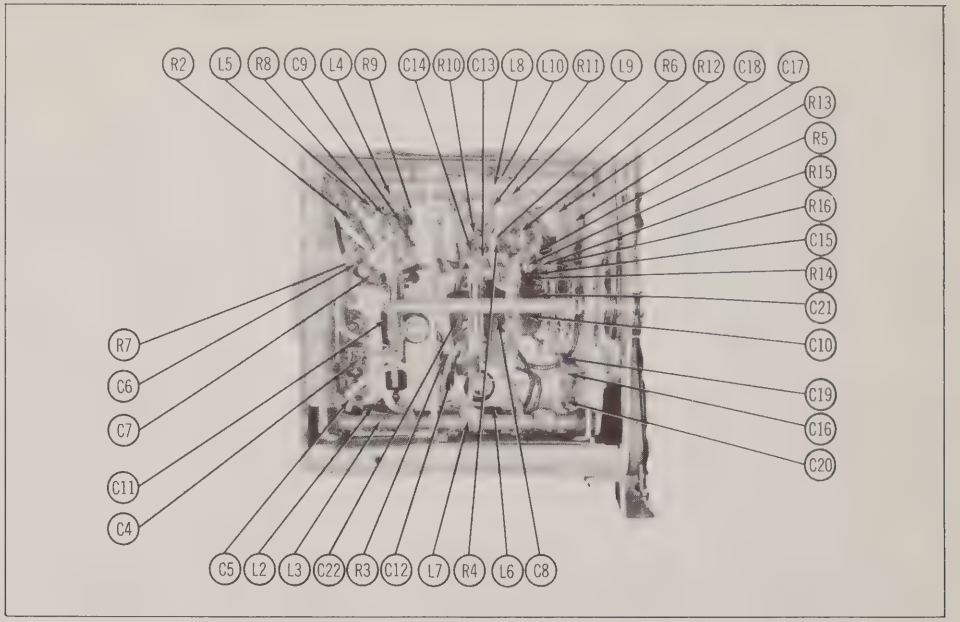
* Items C28A, C28B, C28C, R24A, R24B and R24C are combined in one unit.

♦ Items C26A and C26B and R20 are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: Hallicrafters PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1.5Meg	1/2	25-B1076				UF155L	Not used- Panel
B	1 Meg						URI6L	Volume-Rear
C	Switch						US27	Attach to R1B

RF SECTION BOTTOM VIEW



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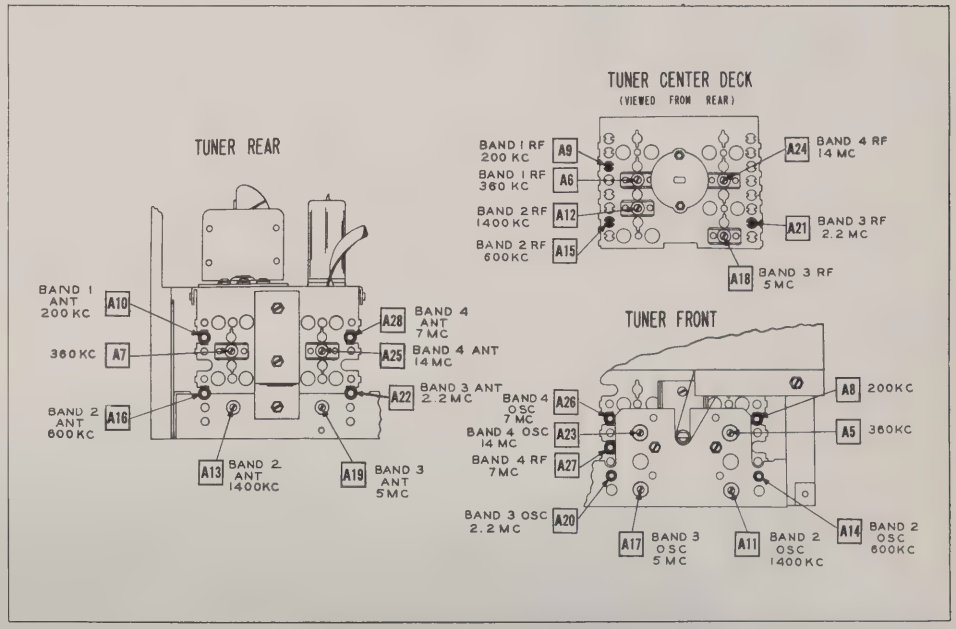


PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R2	100KΩ	1/2	23X20X104K	BTS-100K	
R3	33KΩ	1/2	23X 20X333K	BTS-33K	
R4	680Ω	1/2	23X20X681K	BTS-680	
R5	12KΩ	1/2	23X20X123K	BTS-12K	
R6	82Ω	1/2	23X20X820K	BTS-82	
R7	1 Meg	1/2	23X20X105K	BTS-1 Meg	
R8	82Ω 5%	1/2	23X20X820J	BTS-82 5%	
R9	15KΩ	1/2	23X20X153K	BTS-15K	
R10	10 Meg	1/2	23X20X160K	BTS-10 Meg	
R11	120Ω 5%	1/2	23X20X121J	BTS-120 5%	
R12	180KΩ	1/2	23X20X184K	BTS-180K	
R13	1 Meg	1/2	23X20X105K	BTS-1 Meg	
R14	68KΩ	1/2	23X20X683K	BTS-68K	
R15	33Ω	1/2	23X20X330K	BTS-33	
R16	1000Ω	1/2	23X20X102K	BTS-1000	
R17	1000Ω	1/2	23X20X102K	BTS-1000	
R18	2. 2Meg	1/2	23X20X225K	BTS-2. 2Meg	
R19	2. 2Meg	1/2	23X20X225K	BTS-2. 2Meg	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R20	47KΩ	1/2	♦	BTS-47K	
R21	1500Ω 5%	1/2	23X20152K	BTS-1500 5%	
R22	33KΩ	1/2	23X20X333K	BTS-33K	
R23	10 Meg	1/2	23X20X160K	BTS-10 Meg	
R24A	4. 7Meg	1/2	*	BTS-4. 7Meg	
B	1 Meg	1/2		BTS-1 Meg	
C	2. 2 Meg	1/2		BTS-2. 2Meg	
R25	68Ω 5%	1/2	23X20X680J	BTS-68 5%	
R26	100Ω 5%	1/2	23X20X101J	BTS-100 5%	
R27	10 Meg	1/2	23X20X106K	BTS-10 Meg	
R28	220Ω 5%	1/2	23X20X221J	BTS-220 5%	
R29	1500Ω 5%	1/2	23X20X152J	BTS-1500 5%	
R30	3300Ω 5%	1/2	23X20X332J	BTS-3300 5%	
R31	2000Ω 5%	10	24B981		
R32	1000Ω	1/2	23X20X102K	BTS-1000	
R33	1000Ω	1/2	23X20X102K	BTS-1000	
R34	82Ω 5%	2	23X40X820J		
R35	330KΩ	1/2	23X20X334K	BTS-330K	

♦ Items R20, C26A, C26B are combined in one unit.
* Items R24A, R24B, R24C, C28A, C28B, C28C are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Hallicrafters PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	8KΩ	3.3Ω	Part of Spkr.						
		SEC.2							
		10.5Ω							
		Res.							

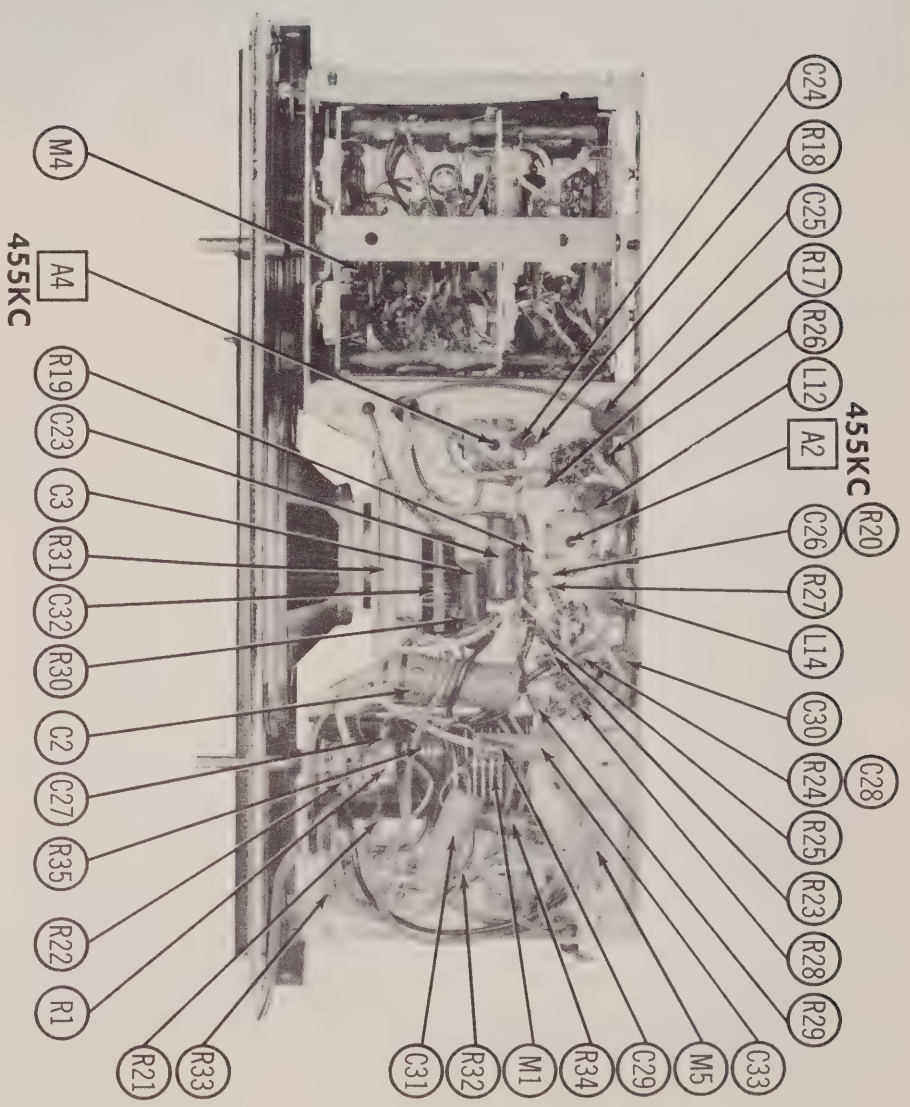
SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA Hallicrafters PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	5 1/4"	PM	3.3Ω	85C161	ST-803 Mod. P525-V	52A1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Hallicrafters PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coil	.7Ω		57B203				Band 1 & 2
L2	Ant. Loading Coil	18Ω		51B1831				Band 1 (170-415KC)
L3	Ant. Loading Coil	2.5Ω		51B1832				Band 2 (530-1620KC)
L4	Ant. Coil	.6Ω		51B1833				Band 3 (2-6MC)
L5	Ant. Coil	.1Ω		51B1834				Band 4 (6-18MC)
L6A	RF Coil	18Ω		51B1826				Band 1
B	Osc. Coil	2.8Ω	9.5Ω					Band 1
L7A	RF Coil	6Ω		51B1827				Band 2
B	Osc. Coil	2Ω	6Ω					Band 2
L8A	RF Coil	.6Ω		51B1828				Band 3
B	Osc. Coil	.5Ω	1.2Ω					Band 3
L9	RF Coil	.1Ω		51B1830				Band 4
L10	Osc. Coil	.3Ω	.1Ω	51B1829				Band 4
L11	Input IF	22Ω	22Ω	50C233	16-6758	BC-352	12-C1	
L12	Fil. Choke	5.5Ω		53A265		BC-526	4662	1 Microhenry
L13	Output IF	15Ω	15Ω	50C242	16-6758	BC-353	12-C2	
L14	Fil. Choke	5.5Ω		53A265		BC-526	4662	1 Microhenry

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Hallicrafters PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.067A	27B190	1004A	RS75	6S100A	100A	5M1	

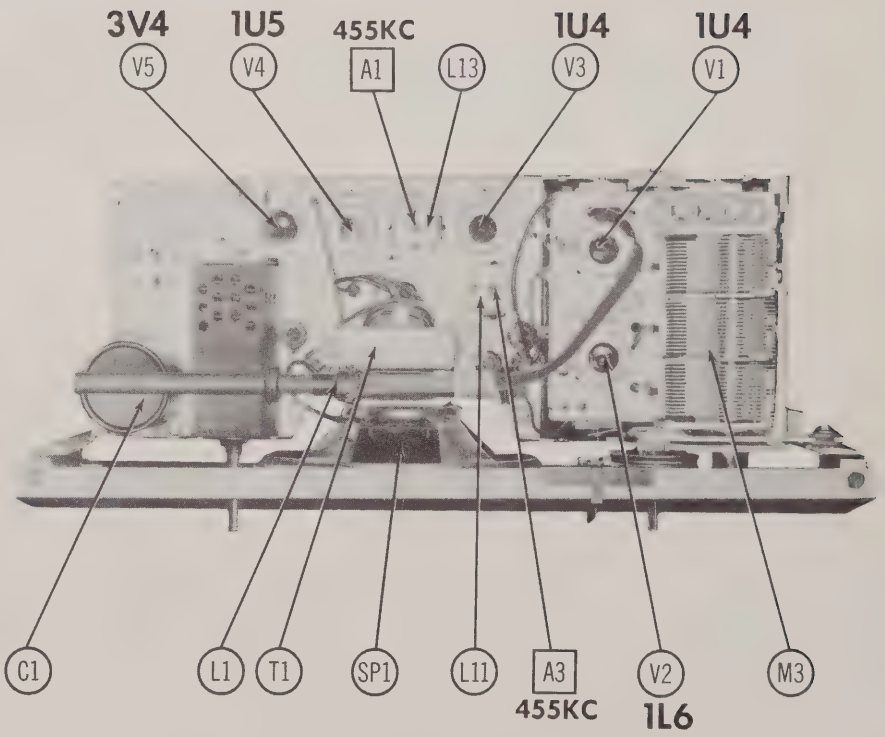
BATTERIES

ITEM No.	VOLTAGE	Hallicrafters PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	9V "A" 90V "B"	P1000			757			F6A60P	

MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M3	Tuning cap	48C326	3 section (6-477MMF each)
M4	Switch	60D594	Band selector
M5	Switch	60B593	Power changeover
	Trimmer cap	44A446	10 used (5-25MMF)
	Trimmer cap	44B443	2 used (4-40MMF)
	Cabinet	78F1082	Model TW-500, green lizigator leatherette
	Cabinet	78F1084	Model TW-600, top grain cowhide
	Knob	15A710	Tuning }
	Knob	15C713	Band selector } green, for model TW-500
	Knob	15B728	Volume }
	Knob	15A715	Tuning }
	Knob	15A718	Band selector } brown, for model TW-600
	Knob	15A729	Volume }
	Handle	121-331	Green plastic, model TW-500
	Handle	121-332	Brown leather, model TW-600
	Map	14C382	World-wide time, green, model TW-500
	Map	14C384	World-wide time, brown, model TW-600

CHASSIS—TOP VIEW



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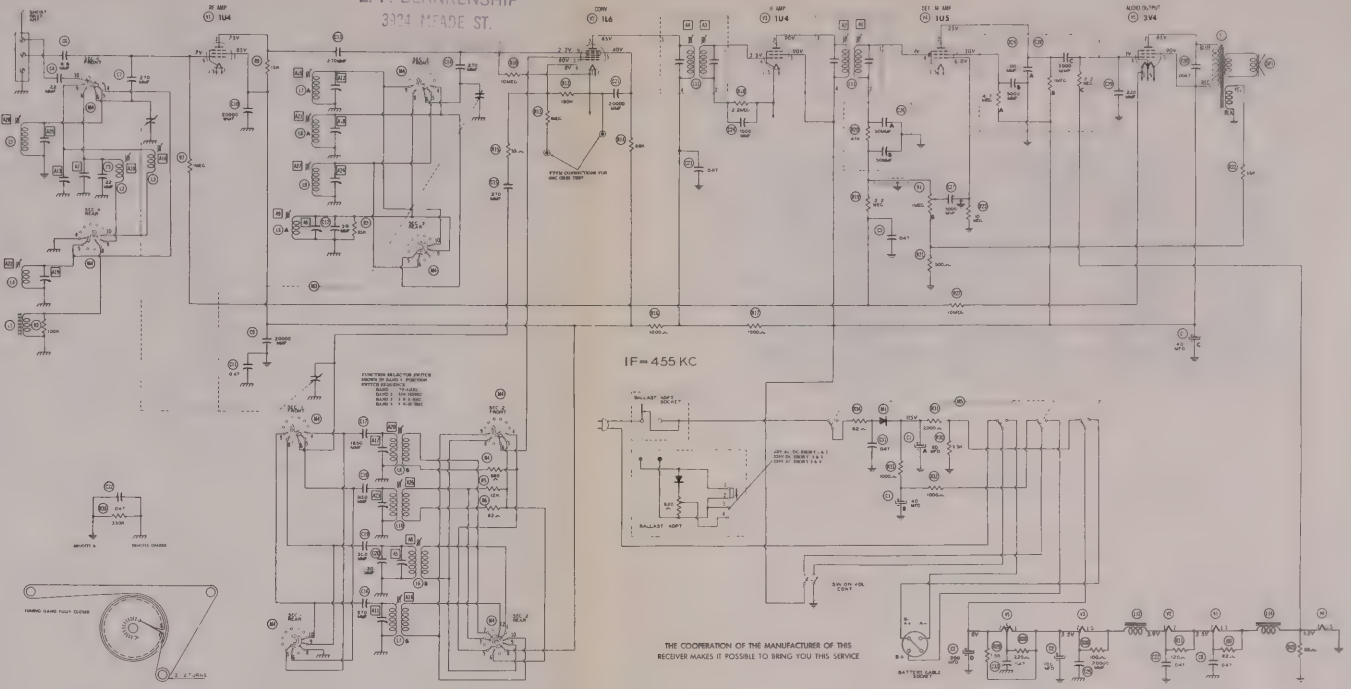

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1U4	*	†19KΩ	†4KΩ	INF	*	1Meg	*
V 2	1L6	*	†3KΩ	†4.1KΩ	180KΩ	†72KΩ	10Meg	*
V 3	1U4	*	†2K Ω	†2KΩ	*	*	2.2Meg	*
V 4	1U5	0Ω	†1Meg	†4.7Meg	1.1Meg	*	10Meg	*
V 5	3V4	*	†2.3KΩ	†2KΩ	INF	*	2.2Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
† MEASURED FROM OUTPUT OF M1

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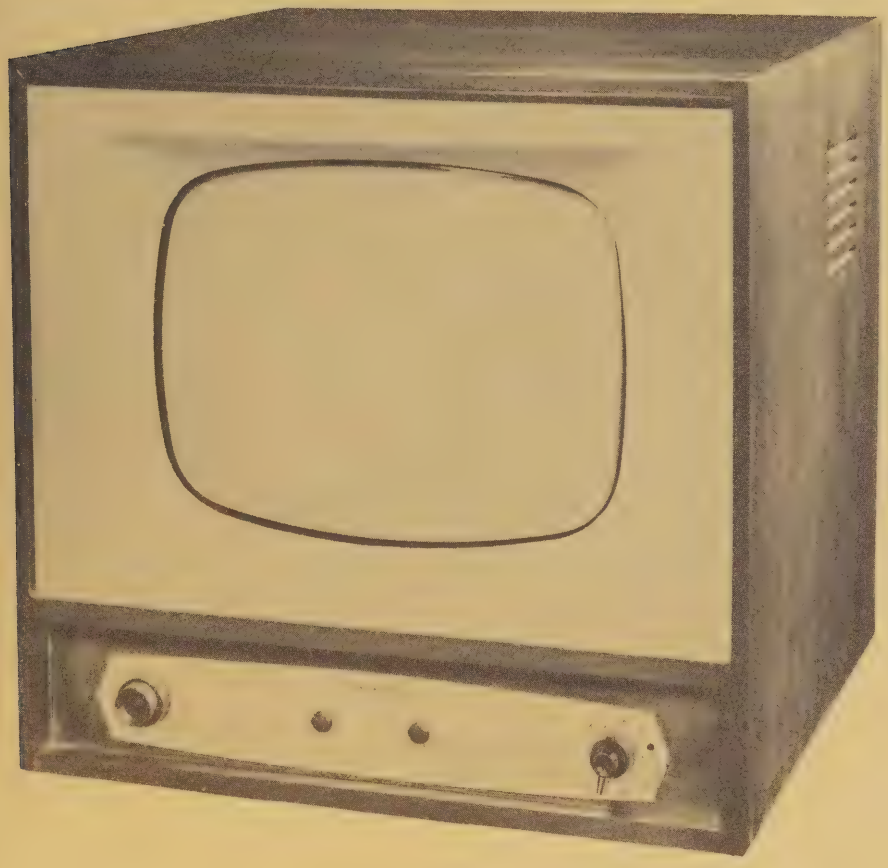

CHASSIS 9047

MIRRORTONE
CH. 9047, 9055

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MIRRORTONE
CH. 9047, 9055

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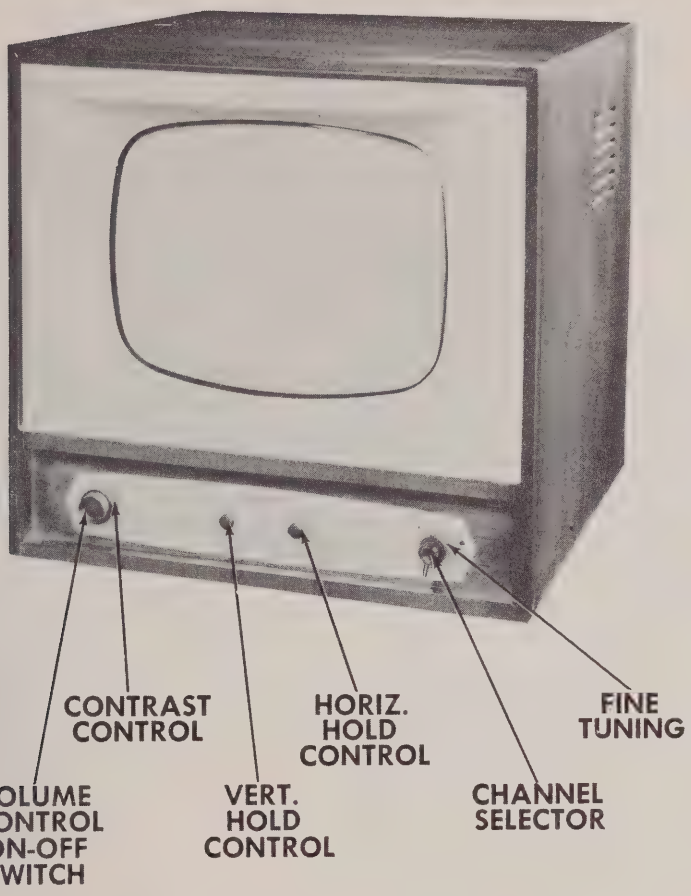

MIRRORTONE CH. 9047

TRADE NAME	Mirrortone Chassis 9047, 9055 (Ch. 9055 Has No Audio Output Stage)
MANUFACTURER	John Meck Industries, Plymouth, Indiana
TYPE SET	Television Receiver
TUBES	Nineteen
POWER SUPPLY	110-120 Volts AC-60 cycle RATING 1.74 Amp. @ 117 Volts AC
TUNING RANGE	Channel 2 thru 13, Video IF 26.1MC, Sound IF 21.6MC (Intercarrier)

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 18
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions 14, 15, 16
Photographs
Cabinet-Rear View 11
Capacitor Identification 4, 9
Chassis-Top View 3
RF Tuner 10
Resistor Identification 19, 20
Photographs (Con't)
Trans., Inductor & Alignment Identification 13
Resistance Measurements 8
Servicing in the Field 18
Schematic 2
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

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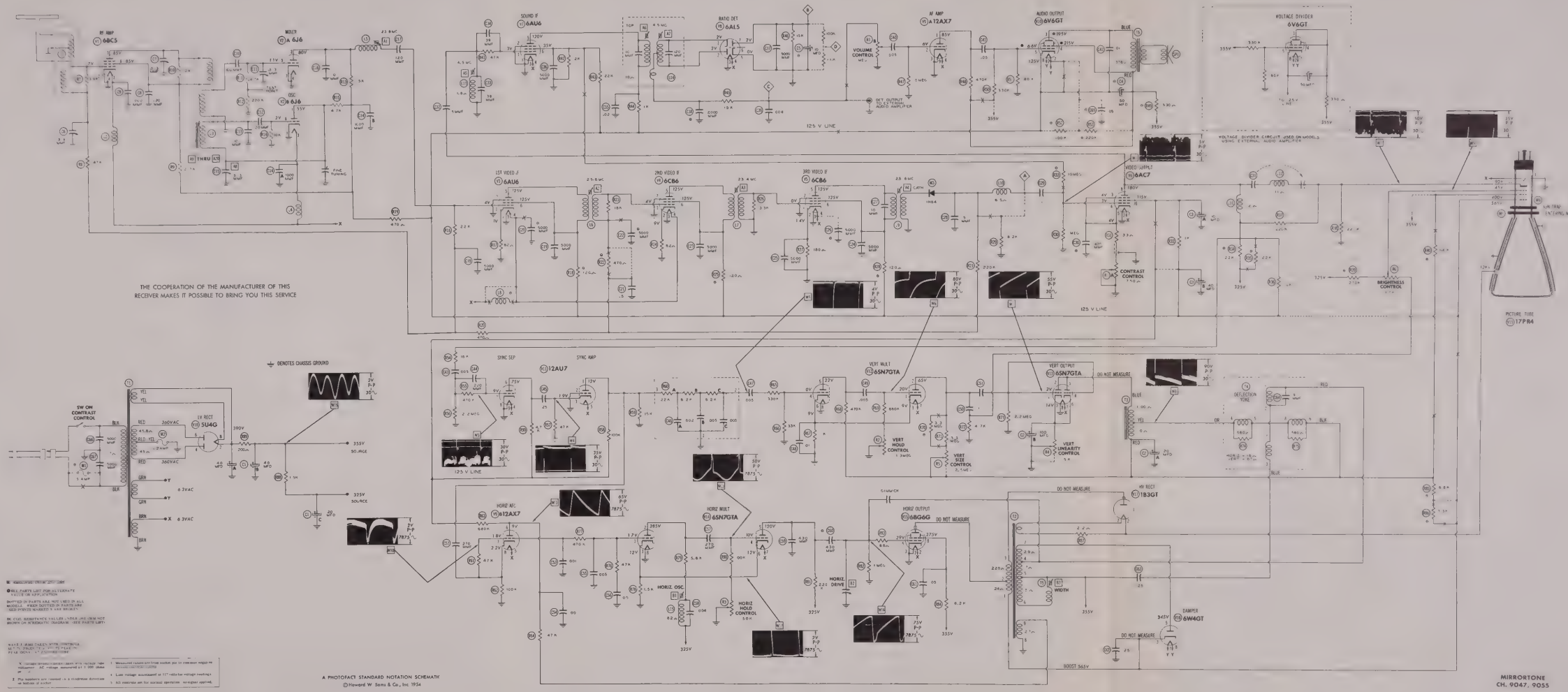
DATE 9-54 SET 251 FOLDER 11

MIRRORTONE
CH. 9047, 9055



MIRRORTONE
CH. 9047, 9055

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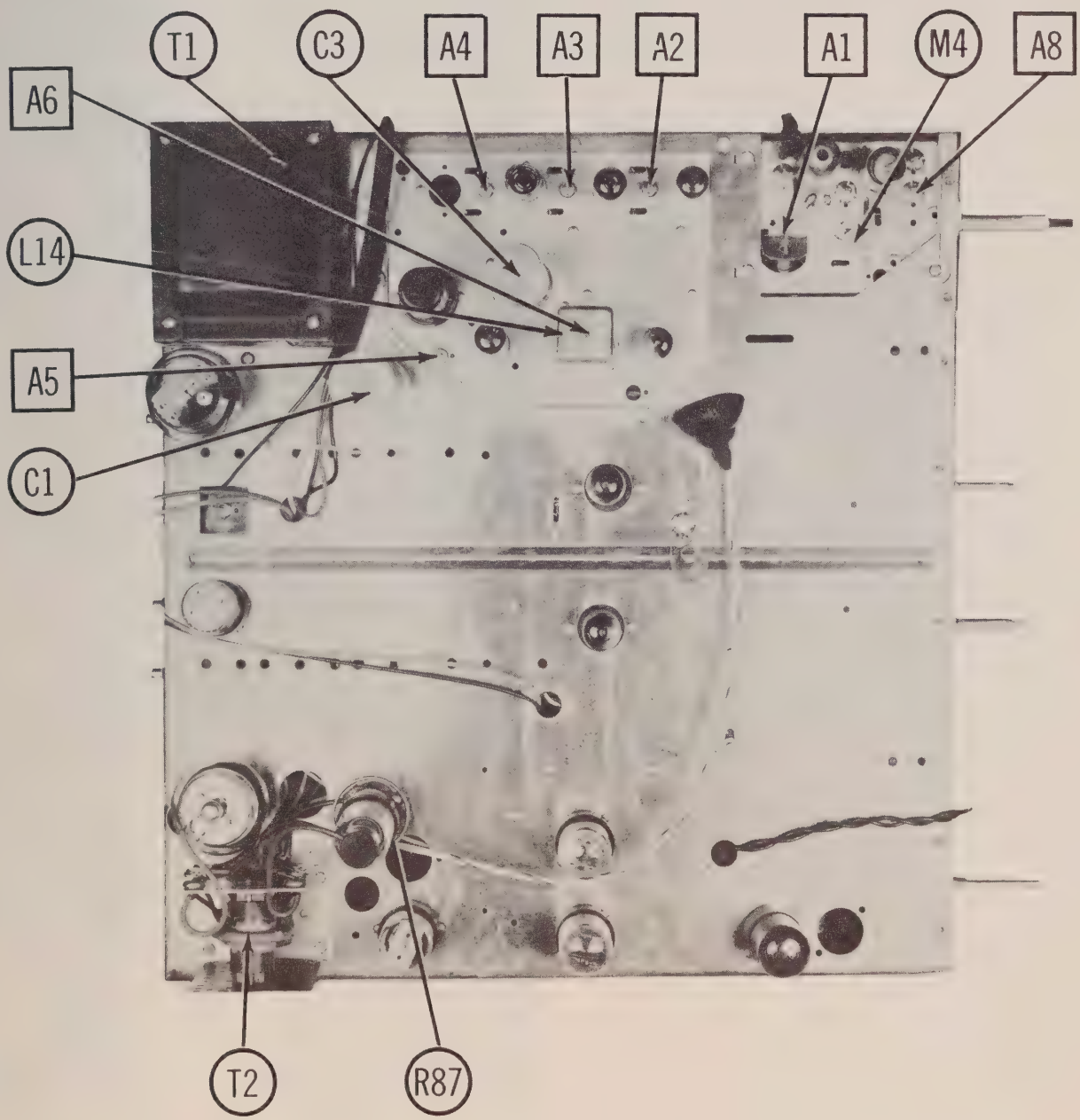
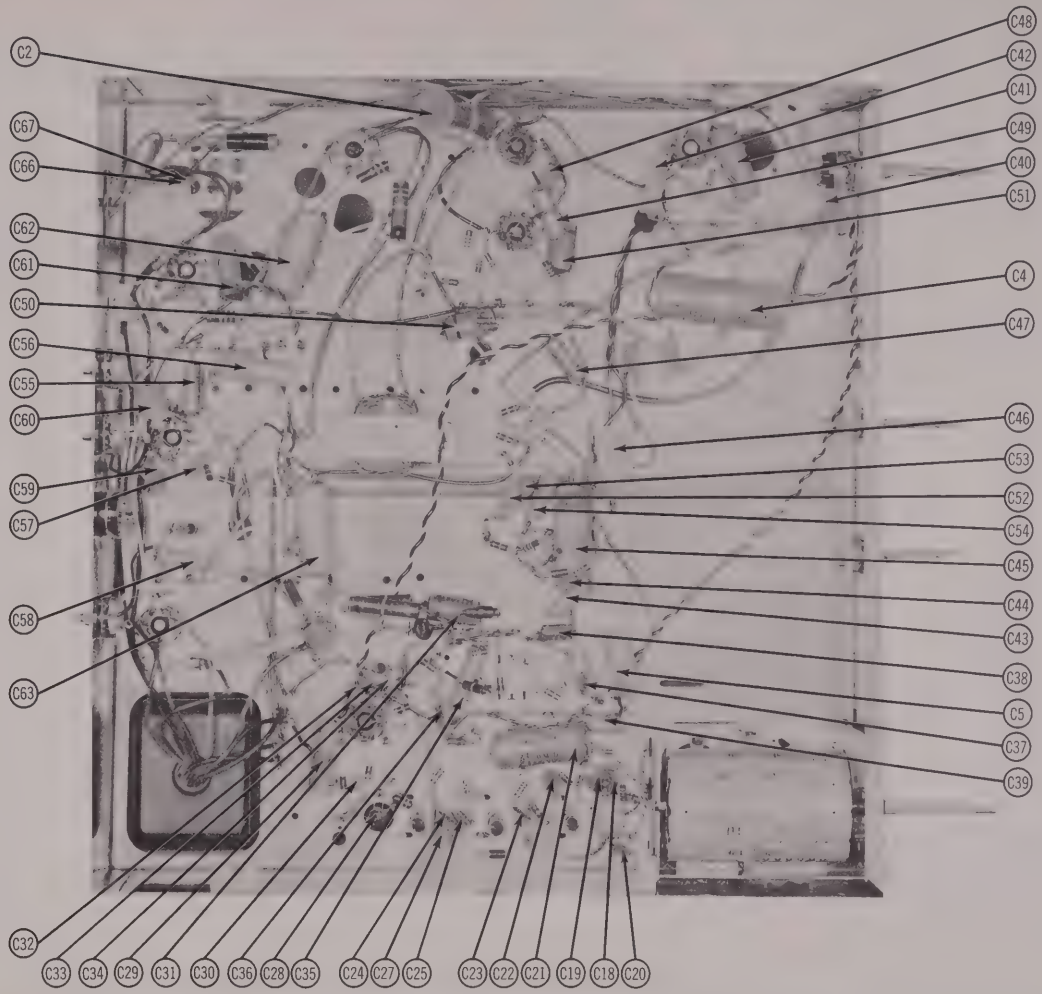
DEVE... BOARD



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART

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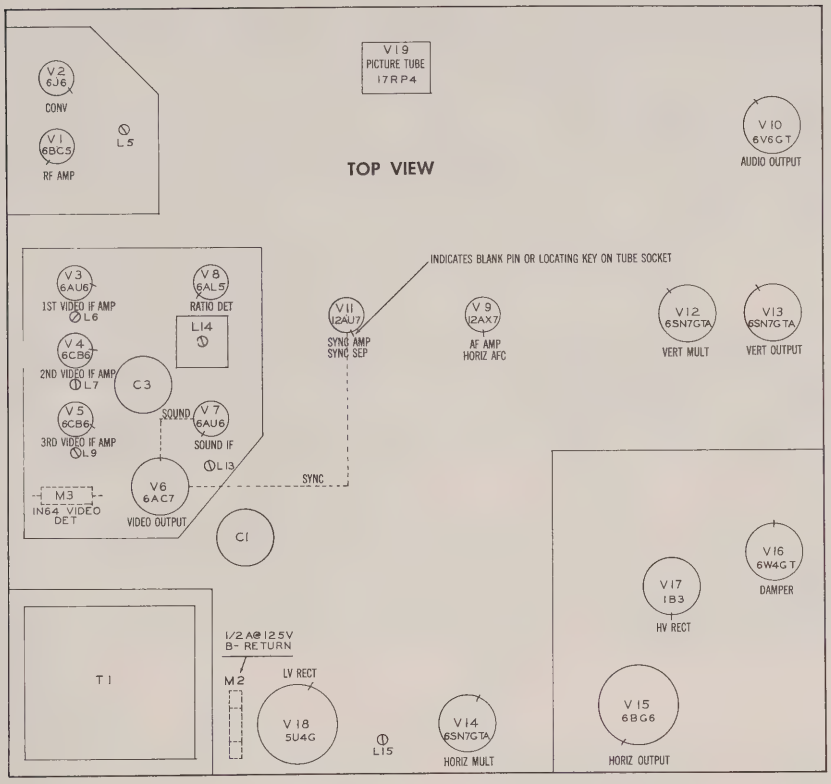
3924 MEADE ST.
DENVER, COLORADO



MIRRORTONE
CH. 9047, 9055

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V18, Fuse (M1 &M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V10
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V19
Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE
No vert. sync - V11, V12
No horiz. sync - V9, V11, V14
No vert. or horiz. sync - V11

SWEEP FAILURE
No raster, has sound - V14, V15, V16, V17, V19
No vertical deflection - V12, V13
Poor vert. linearity or foldover -V12, V13
Poor horiz. linearity or foldover - V14, V15, V16
Narrow picture - V14, V15, V16, V17, V18
Vert. off freq. -V11, V12
Horiz. off freq. - V9, V11, V14

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal multivibrator tube (V14) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C21.
Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	23.8MC (Unmod)	Any	DC probe thru 1Meg to point Ⓐ. Common to chassis.	A1	Adjust for maximum deflection. Attenuate generator output to maintain 1 volt on VTVM.
2.	"	"	25.8MC	"	"	A2	"
3.	"	"	23.4MC	"	"	A3	"
4.	"	"	25.6MC	"	"	A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Direct	High side to ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.6MC 22.7MC 26.1MC	Any	Vert. Amp. thru 100KΩ to point Ⓐ. Low side to chassis.		Check for response curve similar to Fig.1. If necessary, retouch A1 thru A4 to obtain desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point Ⓑ to chassis. The junction of these two resistors is alignment point Ⓓ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point Ⓑ. Common to chassis.	A5, A6	Adjust for maximum deflection. Attenuate generator output to maintain 5 volts on VTVM.
7.	"	"	"	"	DC probe to point Ⓒ. Common to point Ⓓ.	A7	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.01MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point Ⓑ. Low side to chassis.	A5, A6	Disconnect stabilizing capacitor C5. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
7.	"	"	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A7	Reconnect stabilizing capacitor C5. Adjust so that 4.5MC occurs at center of cross-over lines as in Fig. 3. SLIGHTLY retouch A6 for maximum amplitude and straightness of crossover lines.

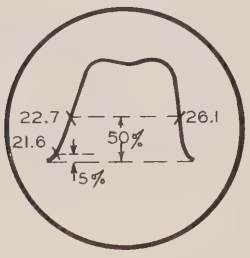


FIG. 1

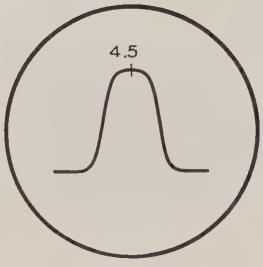


FIG. 2

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Leave the bias battery connected as under "Video IF Alignment ".
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A8. It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct for any individual channel .
If adjustment of A8 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 100KΩ to point A . Low side to chassis.	A9	Adjust to place video marker at 50% on response curve as in Fig. 4. Sound marker should be no higher than 5%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A10	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A11	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A12	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A13	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A14	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A15	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A16	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A17	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A18	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A19	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A20	

RF AND MIXER ALIGNMENT

The RF and Mixer portion of this receiver is very stable and has been properly aligned at the factory . Alignment of this portion should not be required in the field .

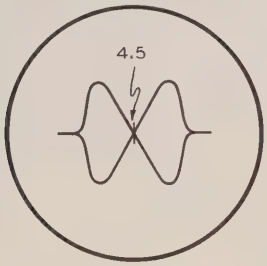


FIG. 3

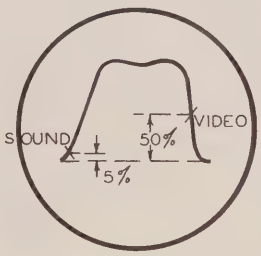
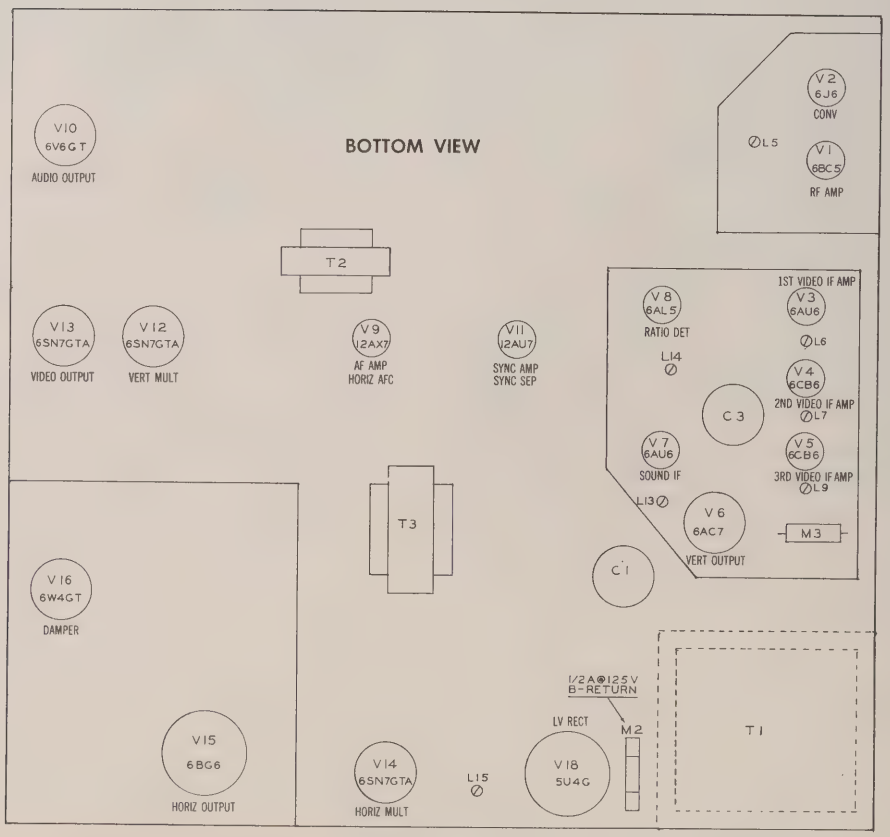


FIG. 4

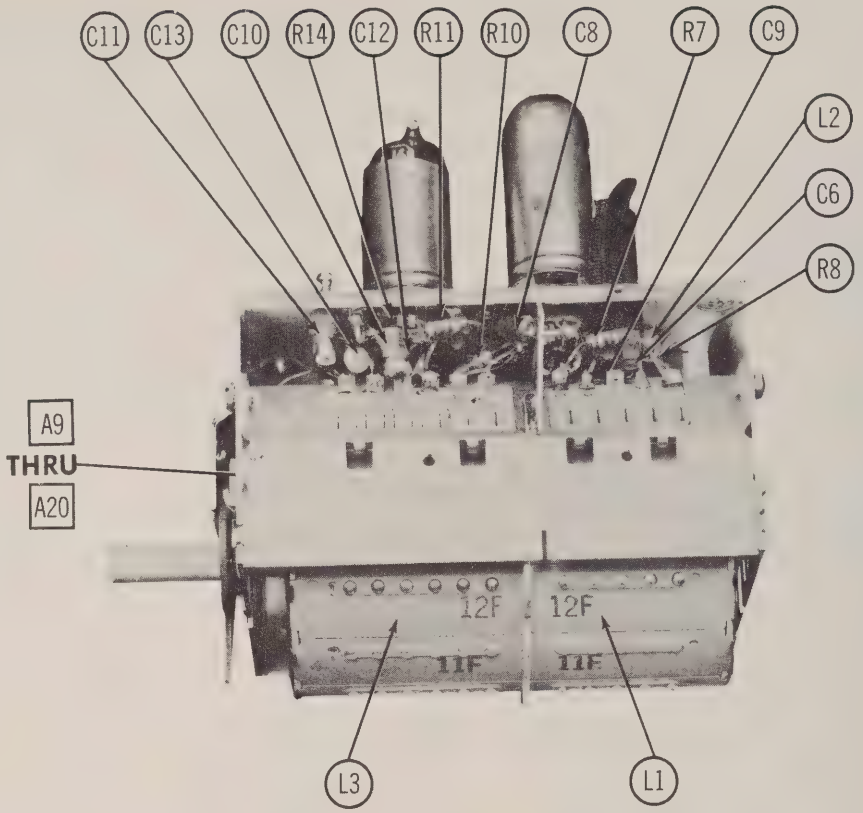
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	275KΩ	0Ω	.1Ω	0Ω	† 2.7KΩ	† 2.7KΩ	0Ω		
V 2	6J6	† 5.1KΩ	† 15.5KΩ	.1Ω	0Ω	225KΩ	10KΩ	0Ω		
V 3	6AU6	250KΩ	0Ω	0Ω	.1Ω	† 120Ω	† 120Ω	82Ω		
V 4	6CB6	230KΩ	82Ω	0Ω	.1Ω	† 120Ω	† 120Ω	0Ω		
V 5	6CB6	.1Ω	180Ω	0Ω	.1Ω	† 120Ω	† 120Ω	0Ω		
V 6	6AC7	0Ω	0Ω	370Ω	1 Meg	370Ω	† 1KΩ	.1Ω	■ 12KΩ	
V 7	6AU6	47KΩ	0Ω	0Ω	.1Ω	† 1KΩ	† 22KΩ	0Ω		
V 8	6AL5	1 Meg	1 Meg	0Ω	.1Ω	0Ω	INF	15KΩ		
V 9	12AX7	■ 470KΩ	10 Meg	0Ω	.1Ω	.1Ω	47KΩ	147KΩ	100KΩ	0Ω
V 10	6V6GT	INF	25KΩ	■ 900Ω	■ 530Ω	180KΩ	INF	25KΩ	25KΩ	
V 11	12AU7	† 100KΩ	0Ω	47KΩ	.1Ω	.1Ω	† 4.7KΩ	2.7 Meg	0Ω	0Ω
V 12	6SN7GTA	1.5Meg	▲2.8Meg	1KΩ	33KΩ	◓ 480KΩ	1KΩ	.1Ω	0Ω	
V 13	6SN7GTA	2.2Meg	◓ 11KΩ	1.2KΩ	2.2Meg	◓ 11KΩ	1.2KΩ	.1Ω	0Ω	
V 14	6SN7GTA	617KΩ	■ 7.1KΩ	1.5KΩ	125KΩ	■ 220KΩ	1.5KΩ	.1Ω	0Ω'	
V 15	6BG6G	2.7Ω	.1Ω	0Ω	47KΩ	1 Meg	INF	0Ω	■ 10KΩ	TOP CAP ◓ 24Ω
V 16	6W4GT	◓ 3.3KΩ	INF	1 Meg	INF	■ 200Ω	INF	25KΩ	25KΩ	
V 17	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ◓ 244Ω
V 18	5U4G	◓ 100KΩ	40KΩ	INF	50Ω	INF	48Ω	◓ 10KΩ	◓ 40KΩ	
V 19	17RP4	0Ω	45KΩ	PIN 6 ◓ 0Ω	PIN 10 ◓ 110KΩ	PIN 11 165KΩ	PIN 12 .1Ω			

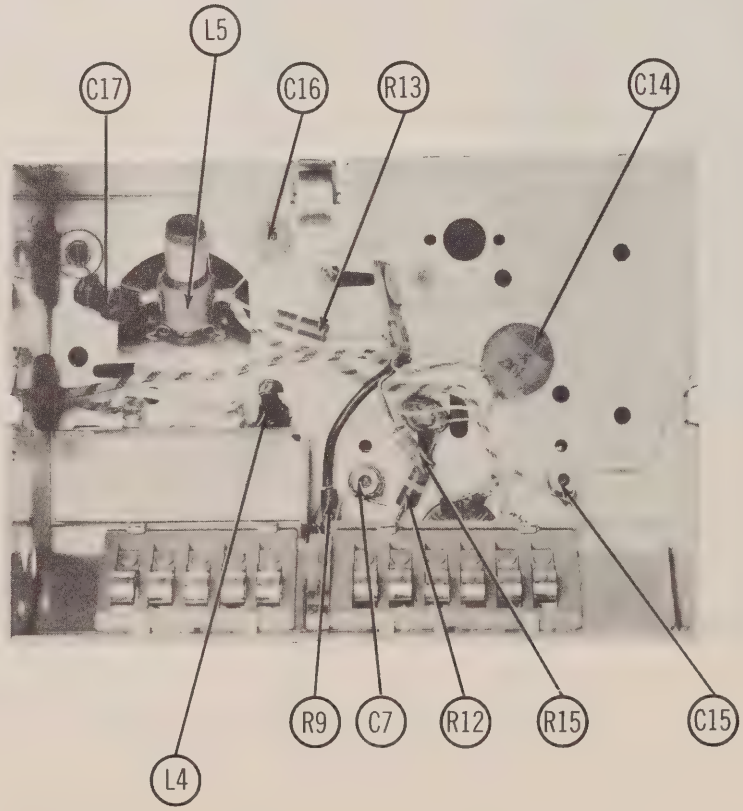
† MEASURED FROM PIN 8 OF V10.
■ MEASURED FROM PIN 2 OF V18.
◓ MEASURED FROM PIN 3 OF V16.



TUBE PLACEMENT CHART

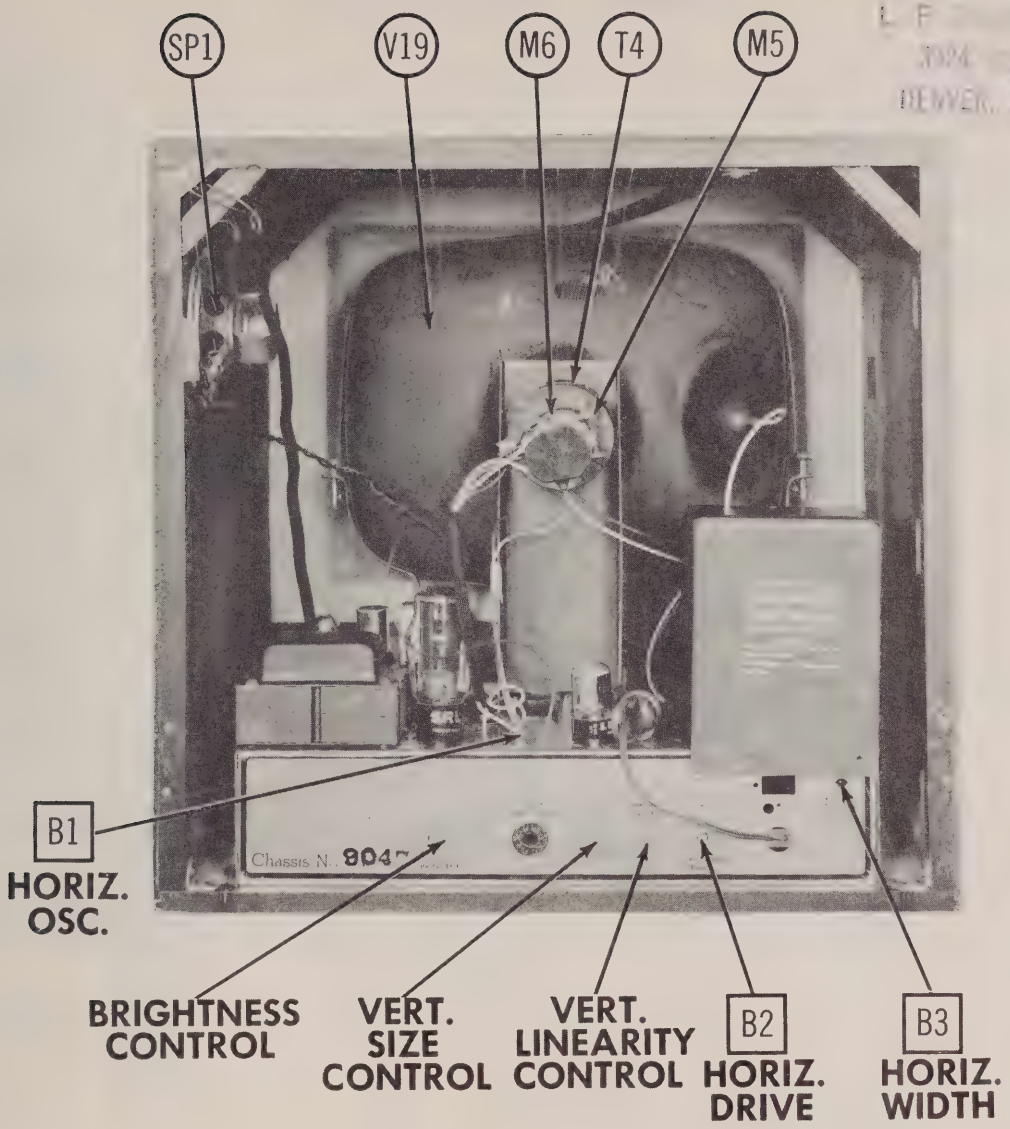


RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW

PROPERTY OF
L. F. [illegible]
3004 [illegible] ST
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position and adjust the horizontal oscillator slug (B1) until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B2) counter clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the width slug (B3) for a picture slightly wider than necessary to fill the picture mask horizontally.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check adjustments B2 and B3. Check by substitution V15, V16, and V18. Check R84, C62, T2, T4A and other associated components.

DRIVE LINES

Check adjustment B2. Check by substitution V15 and V16. Check C60, R84, T2, T4A, T5 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V14, V15 and V16. Check adjustments B2 and B3. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V14, V15 and V16. Check C55 for open. Check L15, C58 and other associated components.

XMAS TREE EFFECT"

Check by substitution V14, V15 and V16. Check L15, C58, C57, C61, R84, R81, R79 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V12 and V13. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check T3, T4B, C2A, C2B, R4 and other associated components.	Check C51, C49, R70, R5, R68, and other associated components.

INSUFFICIENT SWEEP

Check by substitution V12 and V13. Check vertical size and vertical linearity controls for proper operation. If still unsatisfactory proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V12 and V13. Check C67, R5, R70 and other associated components.

COMPRESSED AT TOP

Check by substitution V12 and V13. Check C49, C2B, R4 and other associated components.

FOLDS

Check by substitution V12 and V13. Check C50, R72 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V11. Check C43, C44, C45, R58, R90, R54 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V12. Check waveform W5.

If Satisfactory	If Unsatisfactory
Check R68, R65, R67, C48 and other associated components.	Check vertical integrator network, check video IF stages for overloading.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V9 and V14. Check waveform W12.

If Satisfactory	If Unsatisfactory
Check R79, R78, R76, C55, C56 and other associated components.	Check horizontal AFC network for component failure or change of value.

HORIZONTAL BENDING

Check by substitution V6, V9, V11 and V14. Check horizontal AFC network and other associated components.

VIDEO

LOSS OF VIDEO

Substitute V6. Check L12, C31, L11, R34, R32, C3A, picture tube and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check audio IF alignment.

POOR CONTRAST

Substitute V6. Check contrast control, R31, C29, picture tube and other associated components.

NEGATIVE PICTURE

Substitute V6. Check video crystal detector network. Check picture tube and other associated components.

SMEAR

Check by substitution V6. Check L10, L11, L12 picture tube and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8, V9 and V10. Check stages V9 and V10 using audio signal generator. Apply audio signal across R1.

If Satisfactory	If Unsatisfactory
Check ratio detector network and audio IF stages for component failure or change of value.	Check C40, C41, C42, C4, R48, R49 and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A7 for minimum buzz. If still unsatisfactory check audio IF stages for component failure or change of value.

DISTROTED

Follow procedure outlined under "Weak or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly, check M1 and T1. If filaments light, check by substitution V18. Check B+ filter and decoupling network. Check M2.

SMALL AND/OR DIM PICTURE

Substitute V18. Check B+ filter and decoupling network. Check M2.

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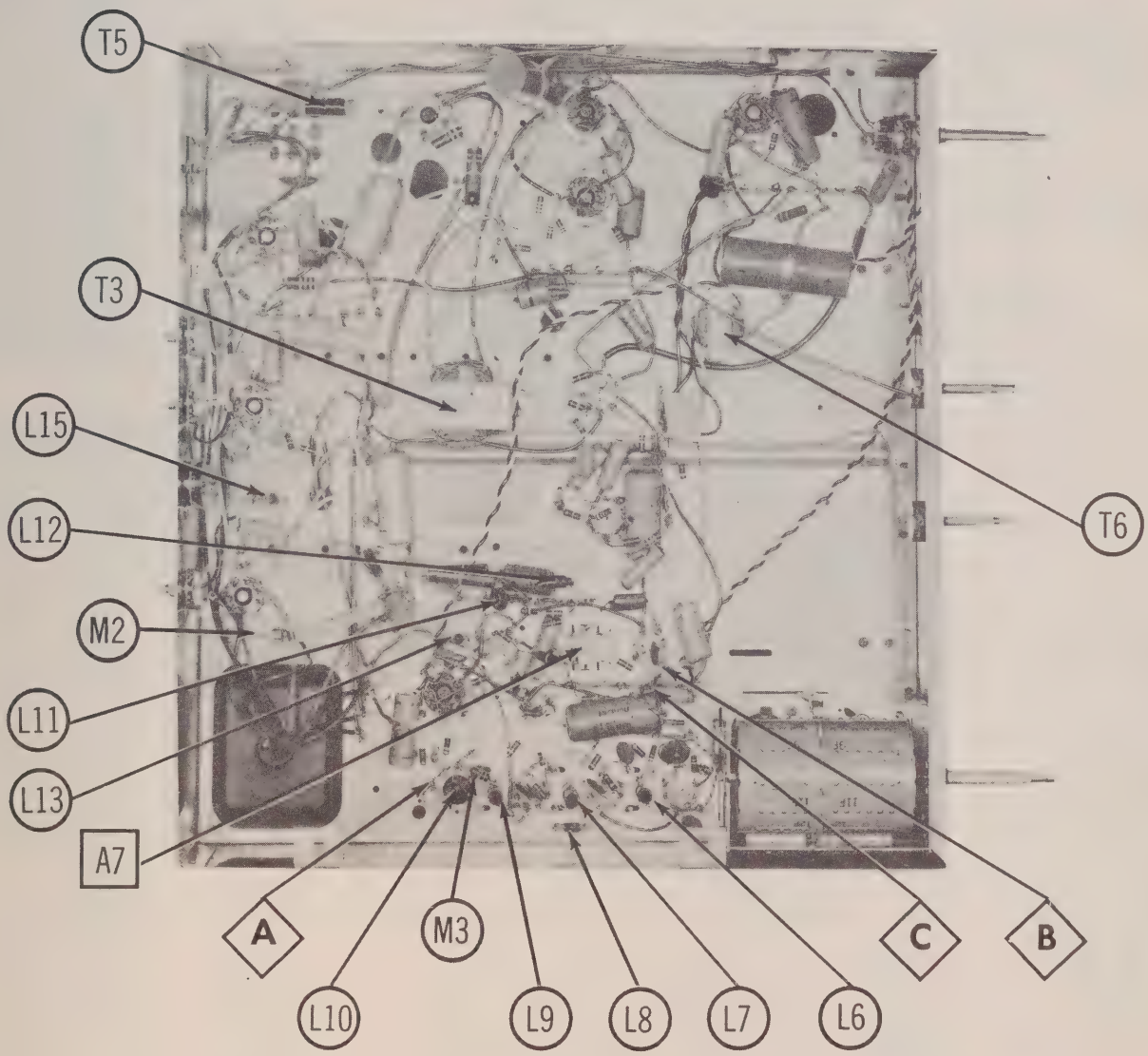
DENVER, COLORADO



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 WEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Mirrortone PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BC8	6BC8	7BD	6AG5 used in some sets
V2	Converter	6J6	6J6	7BF	
V3	1st Video IF Amp.	6AU8	6AU8	7BK	
V4	2nd Video IF Amp.	6CB6	6CB6	7BK	6CB6 used in some sets
V5	3rd Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	6AC7	6AC7	8N	
V7	Sound IF	6AU8	6AU8	7BK	
V8	Ratio Detector	6AL5	6AL5	6BT	
V9	AF Amp-Horiz. AFC	13AX7	12AX7	9A	
V10	Audio Output	6V6GT	6V6GT	T6	In chassis 9055 this tube is used as a voltage divider.
V11	Sync amp. - Sync Separator	12AU7	13AU7	9A	
V12	Vert. Mult	6SN7GTA	6SN7GTA	8BD	
V13	Vert. Output	6SN7GTA	6SN7GTA	8BD	
V14	Horiz. Mult	6SN7GTA	6SN7GTA	8BD	
V15	Horiz. Output	6BG6G	6BG6G	5BT	
V16	Damper	6W6GT	6W6GT	6CG	
V17	Vert. Rectifier	1B3GT	1B3GT	3C	
V18	L.V Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Mirrortone PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No	RETMA BASE TYPE	NOTES
V19	17RP4	17HP4	17RP4	17RP4	17RP4	12L	
	17EP4		17EP4	17HP4	17HP4		

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Mirrortone PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	CLC-10075	AFH-79		C156		FP338 ▲TC75	TVL-3786	
B	▲40	450								
C	▲20	450								
C2A	20	450	CLC-10050	PRS450/20		SR3045		TC75	TVA-1709	Red
B	100	25		PRS25/100		SR2521		TC2501	TVA-1207	Yellow
C3A	▲10	250	CLC-10074	AFH3-38		C023		FP330.7	TVL-2617	
B	▲40	350								
C4	50	350		PRS450/50		SR5035		TC58	TVA-1713	Note 1
C5	10	50		PRS50/10		SR105		TC32	TVA-1304	Note 2
C6	3-9				829-10		3139-01-UK5			
C7	.5-3				829-3		3125-01-UR5	C7565A		
C8	120			SU120	D6-121		GP2K-121	UC-5312	5GA-T12	
C9	1000			BPD-001	DD-102		K069	801-001	DC-521	5HK-D1
C10	100			SU100	D6-101		TP94	GP1K-101	DC-511	5GA-T1
C11	.5-3				829-3			3125-01-UR5	C7565A	
C12	20			SU20NP0	TC2-20		T213	MP0K-200	ZT-542	5TCC-Q2
C13	10			SU10NT50	TC2-10		T198	NT0K-100	NT-541	5TCU-Q1
C14A	1000			BPD-2X001	DD2-102		DK069	812-001	DCD-521	5HK-2D1
B	1000									
C15	.5-3				829-3			3125-01-UR5	C7565A	
C16	10			SU10NP0	TC2-10		Z098	MP0K-100	ZT-541	5TCC-Q1
C17	120			SU120	D6-121		TP95	GP2K-121	UC-5313	5GA-T13
C18	5000			BPD-005	DD-502		K080	811-005	DC-525	5HK-D5
C19	5000			BPD-005	DD-502		K080	811-005	DC-525	5HK-D5
C20	5000			BPD-005	DD-502		K080	811-005	DC-525	5HK-D5 Note 3
C21	.5	200			P288-5		CUB2P5		PT405	5TM-P5
C22	5000			BPD-005	DD-502		K080	811-005	DC-525	5HK-D5 Note 3
C23	5000			BPD-005	DD-502		K080	811-005	DC-525	5HK-D5
C24	5000			BPD-005	DD-502		K080	811-005	DC-525	5HK-D5
C25	5000			BPD-005	DD-502		K080	811-005	DC-525	5HK-D5
C26	5000			BPD-005	DD-502		K080	811-005	DC-525	5HK-D5 Note 3
C27	10			SU10	D6-100		TP99	GP1K-100	UC-541	5GA-Q1
C28	5			SU5	D6-050		TP98	GP1K-050	ZT-555	5GA-V5
C29	.1	600		P688-1	DF-104		CUB6P1		PT601	6TM-P1
C30	470			SM470	D6-471		TP48	GP3K-471	UC-5347	5GA-T47 Note 4
C31	.1	600		P688-1	DF-104		CUB6P1		PT601	6TM-P1
C32	5			SU5	D6-050		TP05	GP1K-050	ZT-556	5GA-V5
C33	39	500		1469-00004			32R5Q39		MS-44	MS-44
C34	39	500		1469-00004			32R5Q39		MS-44	MS-44
C35	.02	600		P688-02	DF-203		CUB6Z2	S17-02	PT612	6TM-Z2
C36	5000			BPD-005	DD-502		K080	811-005	DC-525	5HK-D5
C37	5000			BPD-005	DD-502		K080	811-005	DC-525	5HK-D5
C38	2000	500		1464-003			B5D2		MCB4X7	MB-32 Note 5
C39	.004	400		P688-004	D6-402		CUB6D4	GP2-333-402	PT634	6TM-D4
C40	.005	600		P688-005	D6-502		CUB6D5	GP2-333-502	PT635	6TM-D5
C41	.05	600		P688-05	DF-503		CUB6S5		PT605	6TM-S5
C42	.01	1000		P1088-01	DD1E-103		CUH6S1		PT1611	MB-61
C43	.005	600		P688-005	D6-502		CUB6D5	GP3-333-502	PT635	6TM-D5
C44	220			SU220	D6-221		TP39	GP2K-221	UC-5322	5GA-T22
C45	.25	600		684-25			CUB6P25		PT6025	6TM-P25
C46A	.002								PT623	
B	.005		▲CMX-10012	▲PA-110	▲PC-100	▲UD-T341	▲1408-01		PT635	▲V-1
C	.005								PT635	
C47	.005	600		P688-005	D6-502		CUB6D5	GP2-333-502	PT635	6TM-D5
C48	.01	600		P688-01	D6-103		CUB6Z	GP2-333-103	PT611	6TM-S1
C49	.005	600		P688-CJ5	D6-502		CUB6D5	GP2-333-502	PT635	6TM-D5
C50	.1	600		P688-1	DF-104		CUB6P1		PT601	6TM-P1
C51	.1	600		P688-1	DF-104		CUB6P1		PT601	6TM-P1
C52	270	500		1469-0003			32R1Y27		MCB541	MB-32
C53	.001	600		P688-001	D6-102		CUB6D1	GP2L-102	PT621	6TM-D1
C54	.001	600		P688-001	D6-102		CUB6D1	GP2L-102	PT621	6TM-D1
C55	.005	600		P688-005	D6-502		CUB6D5	GP2-333-502	PT635	6TM-D5
C56	.05	600		P688-05	DF-503		CUB6S5		PT615	6TM-S5
C57	270	500		1469-0003			32R1Y27		MCB541	MB-32
C58	.004	400		1464-004			1R5D4		MCB463	MB-24

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP	RATING: VOLT	REPLACEMENT DATA: Mirrortone PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C59	430	500				9R5T43				
C60	430	500				5R5T43				Note 6
C61	.05	600		P688-05		DF-503	CUB6S5		PT615	6TM-S5
C62	.25	600		684-25			CUB6P25		PT6025	6TM-P25
C63	.25	600		684-25			CUB6P25		PT6025	6TM-P25
C64	91	2000								
C65	.05	600		P688-05		DF-503	CUB6S5		PT615	6TM-S5 Note 3
C66	5000			BPD-005		DD-502	K080	811-005	DC-525	5HK-D5
C67	5000			BPD-005		DD-502	K080	811-005	DC-525	5HK-D5

Note 1. Not used in Ch. 9055.
Note 2. Value may vary from 4MFD to 10MFD. Replace with original value.
Note 3. Not used in all models.
Note 4. Some models use 330MMF in this application.
Note 5. Some models use 1000MMF in this application.
Note 6. Some models use 270MMF in this application.
▲ Items C46A, C46B, C46C, R60A, R60B, R60C are combined in one unit.

CONTROLS

ITEM No	RATING: RESIST ANCE	RATING: WATTS	REPLACEMENT DATA: Mirrortone PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No	INSTALLATION NOTES
R1A	750Ω	½	VCA12140	*QJ-521	RTV-445		UF751-752	Contrast-tapped@357Ω-Panel
B	1Meg	½					UR16-7254	Volume-tapped@250KΩ-Rear
C	Switch						UB-36	Attach to R1A
R2A	1.33Meg	½	VC12132	QU-138	A47-2Meg-S	AB-89	U-165	Vert. Hold
B	Shaft		Not Req.	Not Req.	KBS-3	AK-4	Not Req.	Attach to R2A
R3A	50KΩ	½	VC12131	QU-123	A47-50K-S	AB-51	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KBS-3	AK-4	Not Req.	Attach to R3A
R4A	5000Ω	½	VC12120	QU-114	A47-5000-S	AB-10	SU-14	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FKH-1/4	AK-1	Not Req.	Attach to R4A
R5A	2.5Meg	½	VC12121	QU-239	A47-2.5Meg-S	AB-83	SU-585	Vert. Size
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A
R6A	100KΩ	½	VCA-12135	QU-128	A47-100K-S	AB-40	SU-41	Brightness
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B17-105X & P1-210 (Panel)
B13-137X & R2-226 (Rear) & SWITCH 76-1.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MIRRORTONE PART No.	IRC PART No.	NOTES
R7	3900Ω	½		BTS-3900	
R8	47KΩ	½		BTS-47K	
R9	220KΩ	½		BTS-220K	
R10	10KΩ	½		BTS-10K	
R11	4700Ω	½		BTS-4700	
R12	220KΩ	½		BTS-220K	
R13	15KΩ	½		BTS-15K	
R14	10KΩ	½		BTS-10K	
R15	4700Ω	½		BTS-4700	
R16	22KΩ	½		BTS-22K	
R17	82Ω	½		BTS-82	
R18	120Ω	½		BTS-120	Note 1
R19	470Ω	½		BTS-470	
R20	470Ω	½		BTS-470	
R21	220KΩ	½		BTS-220K	
R22	470Ω	½		BTS-470	Note 2
R23	18KΩ	½		BTS-18K	
R24	82Ω	½		BTS-82	
R25	120Ω	½		BTS-120	Note 1
R26	3300Ω	½		BTS-3300	
R27	180Ω	½		BTS-180	
R28	120Ω	½		BTS-120	Note 1
R29	8200Ω	½		BTS-8200	
R30	1 Meg	½		BTS-1 Meg	
R31	33Ω	½		BTS-33	
R32	1000Ω	½		BTS-1000	
R33	10 Meg	½		BTS-10 Meg	Note 3
R34	22KΩ	2			Note 3
R35	22KΩ	2			Note 3
R36	10KΩ	½		BTS-10K	
R37	220KΩ	½		BTS-220K	
R38	5600Ω	½		BTS-5600	
R39	270KΩ	½		BTS-270K	Note 4
R40	100KΩ	½		BTS-100K	Note 2
R41	47KΩ	½		BTS-47K	
R42	12KΩ	½		BTS-12K	
R43	22KΩ	1		BTA-33K	
R44	1000Ω	½		BTS-1000	
R45	15KΩ	½		BTS-15K	
R46	15KΩ	½		BTS-15K	
R47	10 Meg	½		BTS-10 Meg	
R48	470KΩ	½		BTS-470K	
R49	330Ω	1		BTA-330	Note 5

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MIRRORTONE PART No.	IRC PART No.	NOTES
R50	330KΩ 5%	½		BTS-330K 5%	
R51	180KΩ 5%	½		BTS-180K 5%	
R52	100KΩ	½		BTS-100K	Note 2
R53	220KΩ	½		BTS-220K	Note 2
R54	18KΩ	½		BTS-18K	
R55	470KΩ	½		BTS-470K	
R56	2.2 Meg	½		BTS-2.2Meg	
R57	47KΩ	½		BTS-47K	
R58	100KΩ	½		BTS-100K	
R59	15KΩ	½		BTS-15K	
R60A	22KΩ	2		BTS-22K	* CMX-10012
B	8200Ω	½		BTS-8200	
C	8200Ω	½		BTS-8200	
R61	47KΩ	½		BTS-47K	
R62	100KΩ	½		BTS-100K	
R63	680KΩ	½		BTS-680K	
R64	47KΩ	½		BTA-47K	
R65	330KΩ	½		BTS-330K	
R66	33KΩ	½		BTS-33K	
R67	1000Ω	½		BTS-1000	
R68	470KΩ	½		BTS-470K	
R69	680KΩ	½		BTS-680K	
R70	3.3Meg	½		BTS-3.3Meg	Note 6
R71	3.3Meg	½		BTS-3.3Meg	Note 6
R72	4700Ω	½		BTS-4700	
R73	2.2Meg	½		BTS-2.2Meg	
R74	560Ω	½		BTS-560	
R75	560Ω	½		BTS-560	
R76	47KΩ	½		BTS-47K	
R77	470KΩ	½		BTS-470K	
R78	1500Ω	½		BTS-1500	
R79	5600Ω	½		BTS-5600	
R80	100KΩ	½		BTS-100K	
R81	220KΩ	½		BTS-220K	
R82	1 Meg	½		BTS-1 Meg	
R83	68Ω	½		BTS-68	
R84	8200Ω	½		BTS-8200	
R85	6800Ω	2		BTS-6800	Note 7
R86	3300Ω	½		BTA-3300	Note 2
R87	2.2Ω	1			
R88	200Ω	10			
R89	1500Ω	½		BTA-1500	
R90	4700Ω	½		BTS-4700	

▲ Items R60A, R60B, R60C, C46A, C46B, C46C, are combined in one unit.
Note 1. Some models may use a 100Ω resistor in this application.
Note 2. Not used in all models.
Note 3. Some models may use a single 1MΩ 4 watt resistor in this application.
Note 4. Some models may use a 330KΩ resistor in this application.
Note 5. Some models may use a 390Ω resistor in this application.
Note 6. Some models may use a single 820KΩ resistor in this application.
Note 7. Some models may use a 8200Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	REPLACEMENT DATA: Mirrortone PART No.	Stancor PART No	Merit PART No	Triad PART No	RCA TYPE No	Halldorson PART No	Thordorson PART No
T1	117VAC @1.74A	740VCT 200ADC	5VAC @3A	TPC-10011	P-8169 ①	P-3078	R-37BC	201210	PW31	
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC @1.2A	6.3VAC @6.3A								

① Tape 6.3V @ 1.2A winding.
② Tape 6.3V @ 5A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: Mirrortone PART No.	Stancor PART No.	Merit PART No.	Triad PART No	RCA TYPE No.	Halldorson PART No	Thordorson PART No
T2	Horiz. Output Trans.	THC-10017C		HVO-10 * ②	D-33* ①	231T1 & 214R1 *	FB410 *	
T3	Vert. Output Trans.	TOB-10045H	A-8123	A-3057		232T1	21804	26S52
T4A	Yoke-Horiz.(DMH)	YDB-10001C	DY-2A	MDF-70	Y-21-1	206D1②	DF601	Y-5 2
B	Vert.(VMH)							
T5	Width Coil (.05-.3MH)	TOA-10023C	WC-1			201R1		WC-10

①. Drill new mounting holes.
②. Use original yoke network.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordorson Replacement Connections
				Hi-Volt Rect Plate Lead	Hi-Volt Rect Plate Lead	
3		3	3	1		
2	2	2	2	3	9	
1	1	1	1	4		
7	4	4	9	8		
4	5	5	8	6		
5	8	8	5	5		
8	6	6	4	7		
6	9	9	6	214R1 Term C	11	
9	7	7	7	214R1 Term E	1	
Connect Width Coil Across 5 & 6	8 & 6	8 & 6	8 & 6	214R1 Term A & B 5 & 4	5 & 7	
Special Notes ③						

③ If the picture is out of phase, reverse primary or secondary of 214R1.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI	IMPEDANCE: SEC	REPLACEMENT DATA: Mirrortone PART No.	Stancor PART No	Merit PART No	Triad PART No	Halldorson PART No	Thordorson PART No	NOTES
T6	5.1KΩ	3.3Ω	TOC-10035	A-3877	A-2930	S-3X	21000	26S51	

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V C	RATINGS: IMP	REPLACEMENT DATA: Mirrortone PART No.	JENSEN PART No.	QUAM PART No	NOTES
SP1	5	PM	3.3Ω		SCR-10028	ST-105 Mod. P5-X	5A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: Mirrortone PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coils	0Ω CT	0Ω					
L2	Fil. Choke	0Ω						
L3	RF, Mixer Grid & Osc. Coils	0Ω						
L4	Fil. Choke	0Ω						
L5	1st. Video IF	1.9Ω						
L6	2nd. Video IF	.1Ω	.1Ω	TSA-10054B	17-1063	TV-116	6250	
L7	3rd. Video IF	.1Ω	.1Ω	TSA-10054B	17-1063	TV-116	6249	
L8	Fil. Choke	0Ω		LGA-10018A	19-2001	TV-189	6175	.4 Microhenries, Not used in all models.
L9	4th. Video IF	.1Ω	.1Ω	TSA-10054B	17-1063	TV-116	6249	
L10	Series Peaking Coil	6.5Ω		LGA-10032	19-3125		6153	120 Microhenries
L11	Shunt Peaking Coil	12Ω		LGA-10015	19-3300	TV-185	6155	300 Microhenries
L12	4.5MC Trap	1Ω		LGA-10051	20-1004 *	TV-150	1670 *	
L13	Sound IF	1.8Ω		TSA-10050C	17-2400	TV-151	1670	
L14	Ratio Det.	10Ω	.3DCT	TSB-10062A	17-1033	TV-110	1668	
L15	Horiz. Osc.	85Ω		LGA-10017B	19-1578	TV-153	6210	

* Tunable, drill mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Mirrortone PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1		5A 250V	*					
M2	3AG S/B	$\frac{1}{2}$A 125V			313.500 (3AG-1/2A S/B)	(1) 121001 & (1) 121004	MDL$\frac{1}{2}$	(2) 4440

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		Mirrortone PART No.	SYLVANIA PART No.	FEDERAL PART No.	
M3	1N64		1N132 or 1N60	1N60 or 1N64A	Video Detector

MISCELLANEOUS

ITEM No.	PART NAME	Mirrortone PART No.	NOTES
M4	Tuner	TT-10012	VHF-Pentode
	Tuner	TT-10014	VHF-Cascode
M5	Centering Magnet	MDA-10002A	
M6	Ion Trap	ITA-10003	
B2	Trimmer Cap.	CTA-10005	Horiz. Drive
	Knob	K-10091A	Channel Selector, pentode tuner
	Knob	K-10085	Fine tuning
	Knob	K-10086	Contrast
	Knob	K-10087	On/Off/Volume
	Knob	K-10117	Vert. & Horiz. Hold

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
[illegible] COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V14, V15, V16, V17 and V18. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check T2, T4A, T5, C62, C63, C61, R84 and other associated components.	Check C60, C57, C58, C59, R81, R79, R78, L15 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V14, V15, V16, and V18. Proceed as outlined under "Loss of High Voltage ".

BLOOMING

Check by substitution V14, V15, V16, V17 and V18. Check T2, T4A, and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check components associated with the video IF stages.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner Oscillator Circuit may be accomplished by removal of the Channel Selector and Fine Tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the Channel Selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove three (3) wood screws holding wood strip at the top of the safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

Remove safety glass. Remove rear cover, HV lead, picture tube socket, Ion trap, focus magnet, and rubber ring. Loosen 2 front picture tube mounting screws. Remove tube from cabinet front.

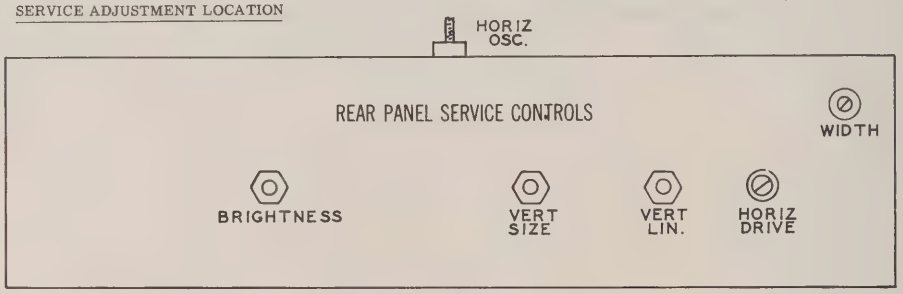
HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the Horiz. Oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the Horiz. Hold Control at the center of its range and adjust the Horiz. Freq. slug (L15) until, picture synchronizes horizontally. (For location see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary (L14) located on bottom of chassis. (See tube placement chart).

SERVICE ADJUSTMENT LOCATION



FUSES

Two fuses are used. One for AC Line Protection and one for L. V. Power Supply Protection, (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting a magnetic ring around the neck of picture tube located flush against the yoke. Turn the knurled (Disk Like) knob and at the same time rotate the ring around the tube until picture is properly centered.

DISASSEMBLY INSTRUCTIONS

Remove 6 push on type control knobs from front panel.

Remove 8 wood screws. Remove rear cover.

Remove 2 wood screws. Remove antenna clamp.

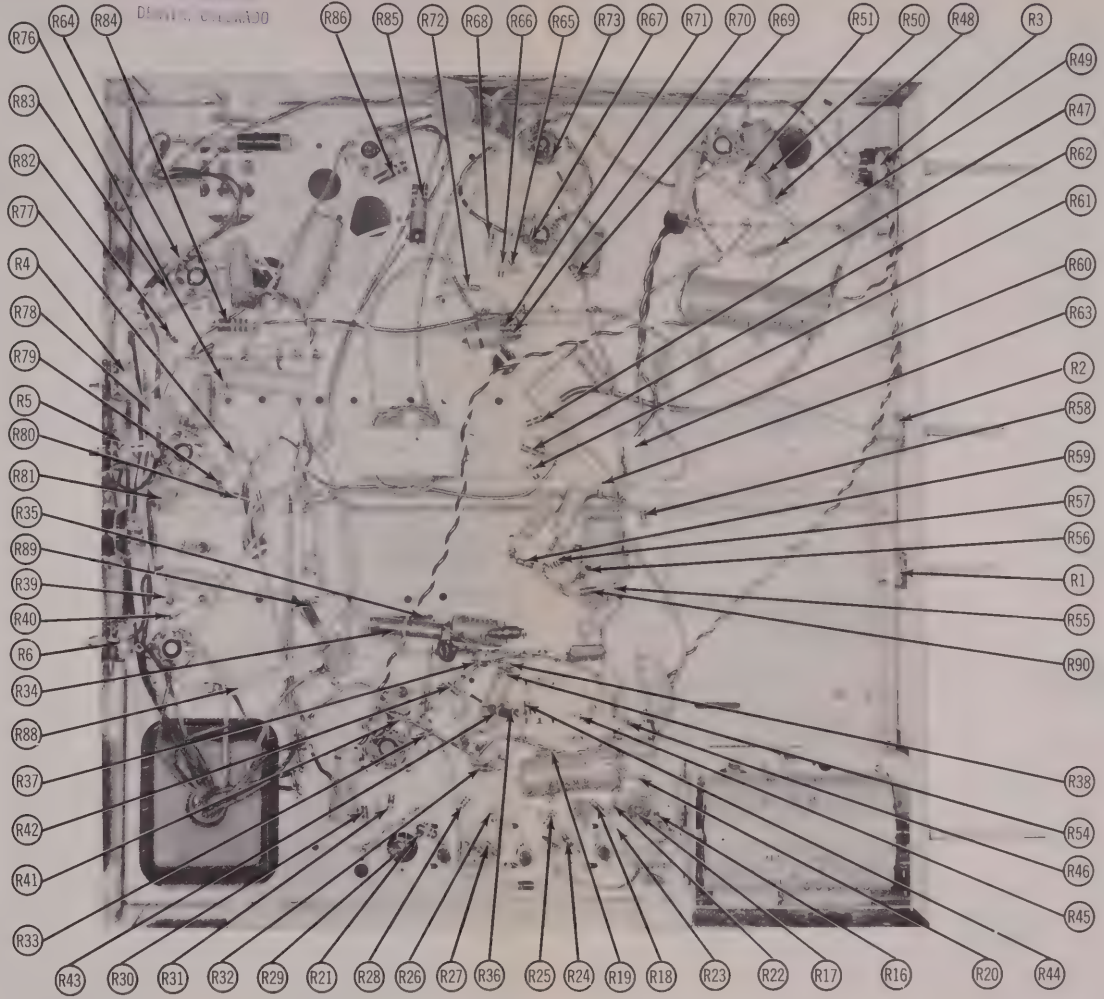
Disconnect speaker leads

Remove 2 speaker nuts. Remove speaker.

Remove 1 wood screw from front picture tube support.

Remove 4 chassis screws. Remove chassis.

PROPERTY OF



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 WADE ST.
DENVER, COLORADO

MITCHELL
MODEL 3D

MITCHELL
MODEL 3D

TRADE NAME	Mitchell Model 3D
MANUFACTURER	Mitchell Mfg. Co., 2525 Clybourn Ave., Chicago 14, Ill.
TYPE SET	AC Operated Audio Amplifier with 3 Speed Automatic Record Changer
TUBES (Six)	Types 6AV6 Pre-Amp., 12AX7 AF Amp., 6SN7GT AF Amp.-Phase Inv., (2) 6W6GT Audio Output 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .7 Amp. @ 117 Volts AC

RECORD CHANGER UNIT - WEBSTER-CHICAGO MODEL 114

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MITCHELL PART No.	STANDARD REPLACEMENT		
V1	Pre-Amplifier	6AV6	6AV6	7BT	
V2	AF Amplifier	12AX7	12AX7	9A	
V3	AF Amplifier-Phase Inverter	6SN7GT	6SN7GT	8BD	
V4	Audio Output	6W6GT	6W6GT	7S	
V5	Audio Output	6W6GT	6W6GT	7S	
V6	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

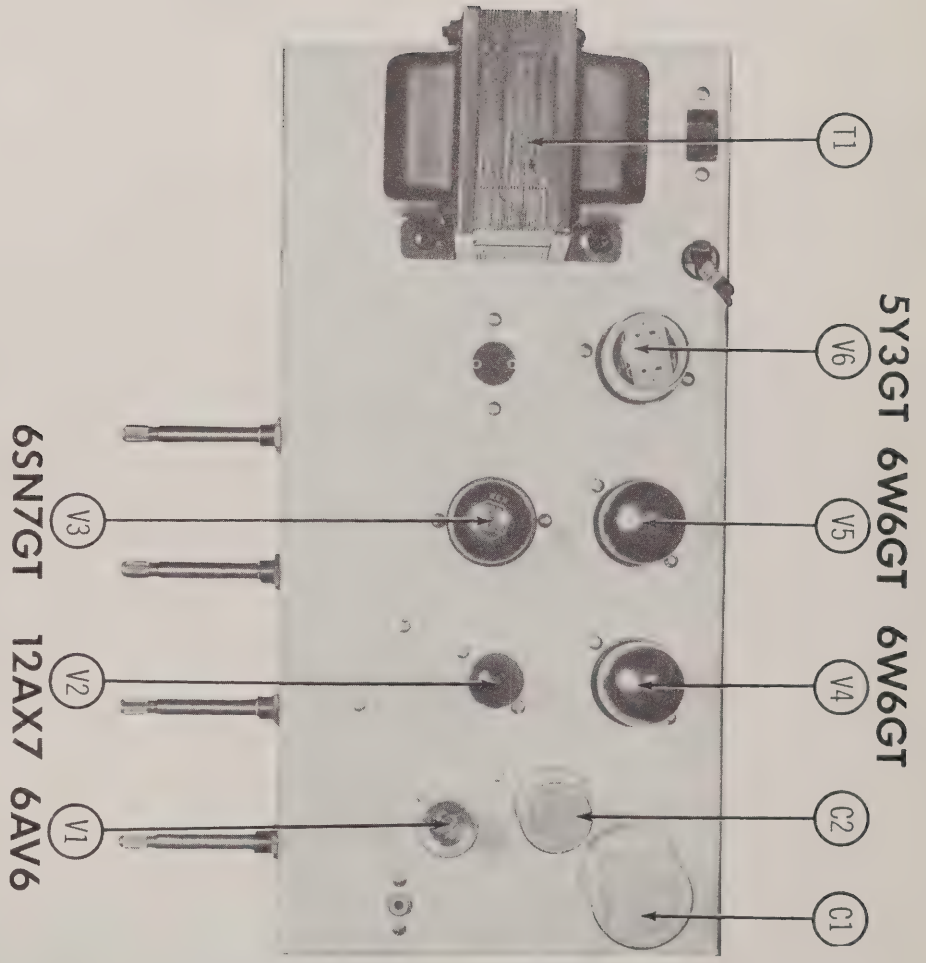
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MITCHELL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲40	250		AFH3-44		C035		FP377	TVL-3728	
B	■40	250		PRS250/40		BR4025		TC58	TVA-1511	
C	▲40	250								
D	40	250								
C2A	■40	250		AFH2-79		B058		FP211	TVL-2505	
B	▲25	25		PRS25/25		BR252		TC58	TVA-1205	
C	25	25								
C3	50	25		PRS25/50		BR502		TC29	TVA-1206	
C4	.0039	400								
C5	.0027	400								
C6	.022	400								
C7	.022	400								
C8	.0015	400								
C9	.0018	400								
C10	.033	400								
C11	330	500		1469-00035		5R5T33		MCE241	MS-33	
C12	.0056	400								
C14	.056	400								
C15	.047	400								
C16	220	500		1469-0002		5R5T22		MCE237	MS-32	
C17	.022	400								
C18	.022	400								
C19	.01	600		689ZX-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MITCHELL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	23S737	Q13-133	A47-500K-Z	BSK-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A
R2A	500KΩ	½	23S715	Q13-133	A47-500K-Z	BSK-60	U-48	Bass
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R2A
R3A	500KΩ	½	23S715A	Q11-133	A47-500K-S	AB-60	U-50	Treble
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R3A

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MITCHELL PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R4	12KΩ	1/2		BTS-12K	Note 1
R5	18KΩ	1/2		BTS-18K	Note 2
R6	6800Ω	1/2		BTS-6800	
R7	3900Ω	1/2		BTS-3900	
R8	100KΩ	1/2		BTS-100K	
R9	10 Meg	1/2		BTS-10 Meg	
R10	100KΩ 5%	1		BTA-100K 5%	
R11	150KΩ 5%	1		BTA-150K 5%	
R12	150KΩ 5%	1/2		BTS-150K 5%	Note 3
R13	2.2Meg	1/2		BTS-2.2Meg	
R14	1 Meg	1/2		BTS-1 Meg	
R15	3900Ω	1/2		BTS-3900	
R16	100KΩ	1/2		BTS-100K	
R17	10KΩ	1/2		BTS-10K	
R18	47KΩ	1/2		BTS-47K	
R19	4700Ω	1/2		BTS-4700	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MITCHELL PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R20	47KΩ	1/2		BTS-47K	
R21	3900Ω	1/2		BTS-3900	
R22	100KΩ	1/2		BTS-100K	
R23	2700Ω 5%	1/2		BTS-2700 5%	
R24	3900Ω 5%	1/2		BTS-3900 5%	
R25	220KΩ	1/2		BTS-220K	
R26	47KΩ	1/2			Note 4
R27	47KΩ	1/2			Note 4
R28	470KΩ	1/2		BTS-470K	
R29	100Ω	2			
R30	470KΩ	1/2		BTS-470K	
R31	100Ω	5		1 3/4A-100	
R32	2200Ω	1		BTA-2200	
R33	33KΩ	2		BTB-33K	
R34	4700Ω	1/2		BTS-4700	

Note 1. Some models may use a 15KΩ resistor in this application.
Note 2. Some models may use a 27KΩ resistor in this application.
Note 3. Some mddels may use a 180KΩ resistor in this application.
Note 4. R26 and R27 must be matched within ± 5%.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA MITCHELL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ .7A	442VCT .106ADC	5VAC @ 2A	6.3VCT @ 3.6A						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA MITCHELL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T2	9.8KΩ	8Ω		A-3870	A-3027 ①	S-19Z ①	Z1404 ①	22S44 ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA MITCHELL PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	8"	PM	8Ω		ST-104 Mod. P8-5	8A6	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA MITCHELL PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	SHURE PART No. CARTRIDGE	SHURE PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M1								

PHONO NEEDLE

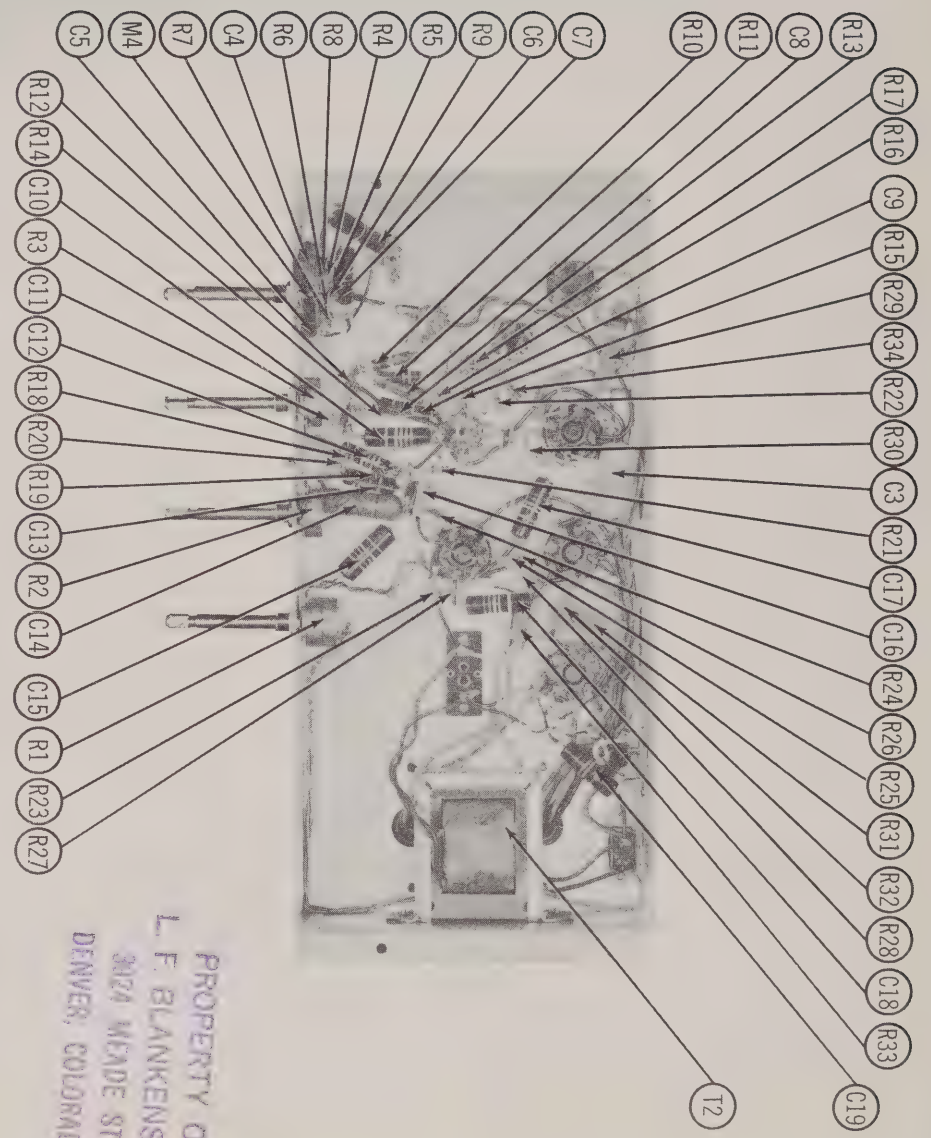
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA MITCHELL PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M2		† GE-11	† AC-410 ♦†AC-410D1 ♦AC-410D	† W-66TPS	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	MITCHELL PART No.	NOTES
M3	Lamp		Neon (not used in all models)
M4	Switch		Equalizer

CHASSIS—BOTTOM VIEW



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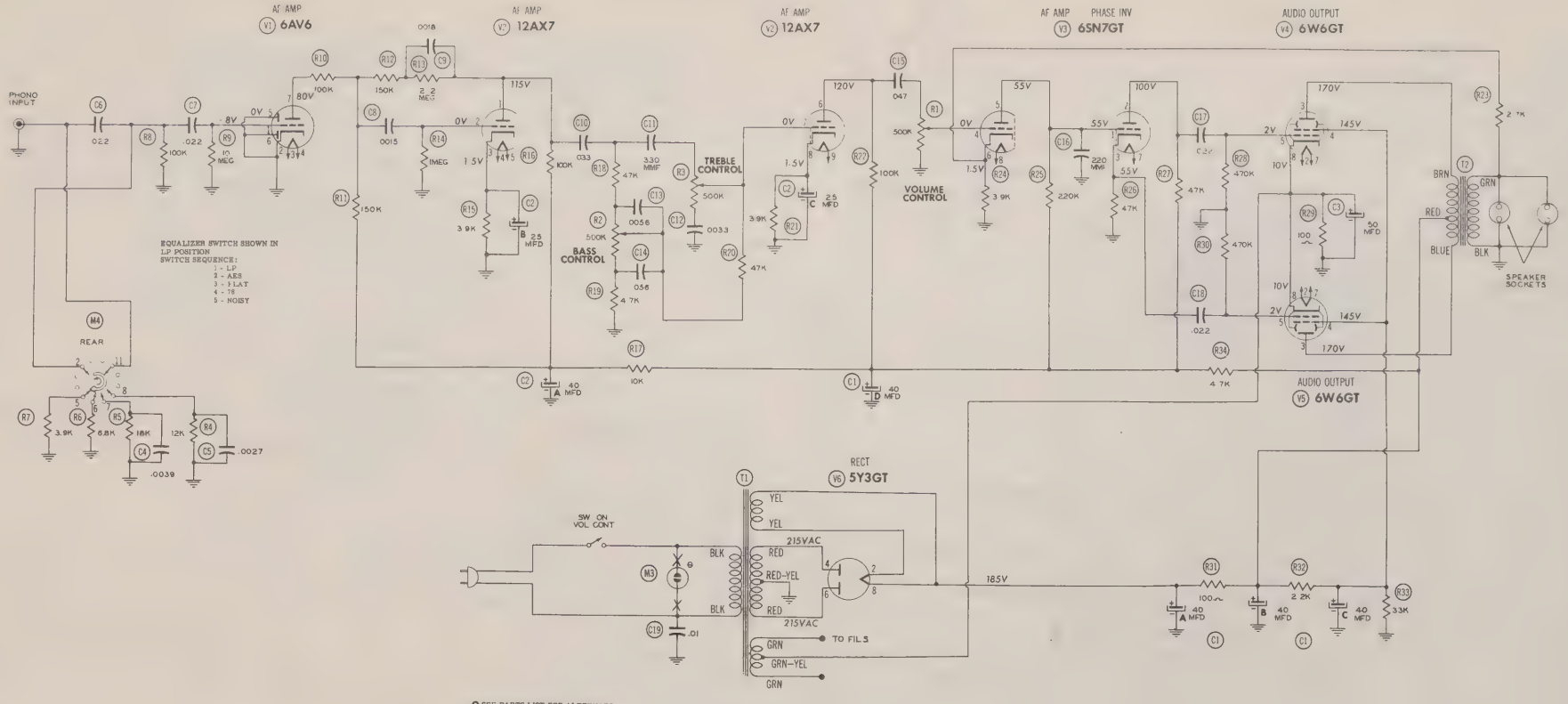
MITCHELL MODEL 3D



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AV6	10Meg	0Ω	100Ω	100Ω	0Ω	0Ω	†265KΩ		
V 2	12AX7	†115KΩ	1Meg	3.9KΩ	100Ω	100Ω	†105KΩ	220KΩ	3.9KΩ	100Ω
V 3	6SN7GT	†220KΩ	†52KΩ	47KΩ	500KΩ	†220KΩ	3.9KΩ	100Ω	100Ω	
V 4	6W6GT	INF	100Ω	†240Ω	†2.3KΩ	470KΩ	†100Ω	100Ω	100Ω	
V 5	6W6GT	INF	100Ω	†240Ω	†2.3KΩ	470KΩ	†4.8KΩ	100Ω	100Ω	
V 6	5Y3GT	INF	35KΩ	INF	53Ω	0Ω	57Ω	†100Ω	35KΩ	

† MEASURED FROM PIN 2 OF V6

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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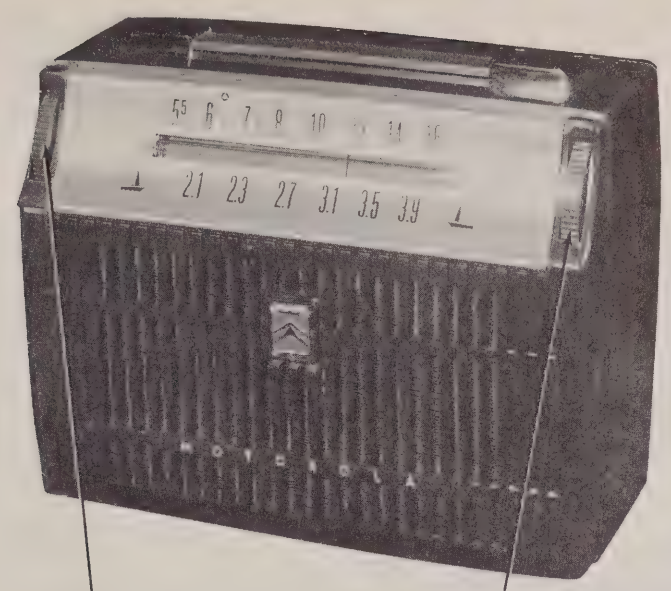
MOTOROLA
MODEL 63LSS (Ch. HS-415)



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MOTOROLA
MODEL 63LSS (Ch. HS-415)

TRADE NAME	Motorola Model 63LSS (Ch. HS-415)
MANUFACTURER	Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	Three Power Portable 2 Band AM Superheterodyne Receiver
TUBES (Five)	Types 1U4 RF Amp., 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Audio Output
POWER SUPPLY	110-120 Volts AC-DC (or) 9 Volts "A" Supply & 90 Volts "B" Supply in Pack Form
RATING	.12 Amp. @ 117 Volts AC (or) 50MA @ 9 Volts DC & 17MA @ 90 Volts DC
TUNING RANGE—BROADCAST	535-1620KC SHORT WAVE 2 to 4MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With tuning gang fully closed set dial pointer opposite index mark on dial back plate.
Attenuate generator output to maintain 0.4 volts on output meter.
Volume control should be at maximum position.
Use an insulated alignment screwdriver for adjusting.
Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (grid) of 1R5 (V2). Low side to B-.	455KC (400~Mod)	BC	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	1400KC	"	Tune to 1400KC signal	"	A5, A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	535KC	"	Tuning gang fully closed	"	A7	Adjust for maximum output. Repeat step 2. Note: A6 should be readjusted for maximum volume after chassis has been reassembled in cabinet.
4.	400Ω Carbon Resistor	High side thru 400Ω to junction of Switch antenna and switch antenna coil (L3). Low side to B-.	4.0MC (400~Mod)	SW	Tuning gang fully open	"	A8	Adjust for maximum output.
5.	"	"	3.9MC	"	Tune to 3.9MC signal	"	A9	
6.	"	"	3.0MC	"	3.91MC (See remarks)	"		Check for image frequency.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	1U4	1U4	6AR	
V2	Converter	1R5	1R5	7AT	
V3	IF Amplifier	1U4	1U4	6AR	
V4	Det-AVC-AF Amp.	1U5	1U5	6BW	
V5	Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲100	150	23B611598	AFH3-196		XB006			R1363	
B	■80	150				BRH1225A				
C	▲200	10								
C2	.05	100	8R9805	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	100		21R115639	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C4	10000		21R482726	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C5	10000		21R482726	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	360	500	21R121104							
C7	100		21R115639	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C8	10		21R115884	SI10	D6-100	TP09	GP1K-100	UC-541	5GA-Q1	
C9	10000		21R482726	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C10	10000		21R482726	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C11	10000		21R482726	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C12	.02	200	8R9817	P288-02		PJ2S2		PT412	2TM-S2	
C13A	150		♦21B621535	♦PA-261	D6-151	♦PC-165	GP1K-151	UC-5315	♦DP-1	
B	2000				DD-203		801-002	DC-522		
C	150				D6-151		GP1K-151	UC-5315		
D	1000				DD-102		801-001	DC-521		
E	5000				DD-502		801-005	DC-525		
C14	.002	400	8R4736	P488-002	D6-202	CUB4D2		PT422	4TM-D2	
C15	.05	100	8R9805	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C16	.047	400	8K490232	489ZX-047	DF-503	PJ4S47		PT4147	4TM-S47	
C17	.1	200	8K490210	P288-1	DF-104	PJ2P1		PT401	2TM-P1	

♦ Items C13A, C13B, C13C, C13D, C13E, R16A, R16B and R16C are combined in one unit.

CONTROLS

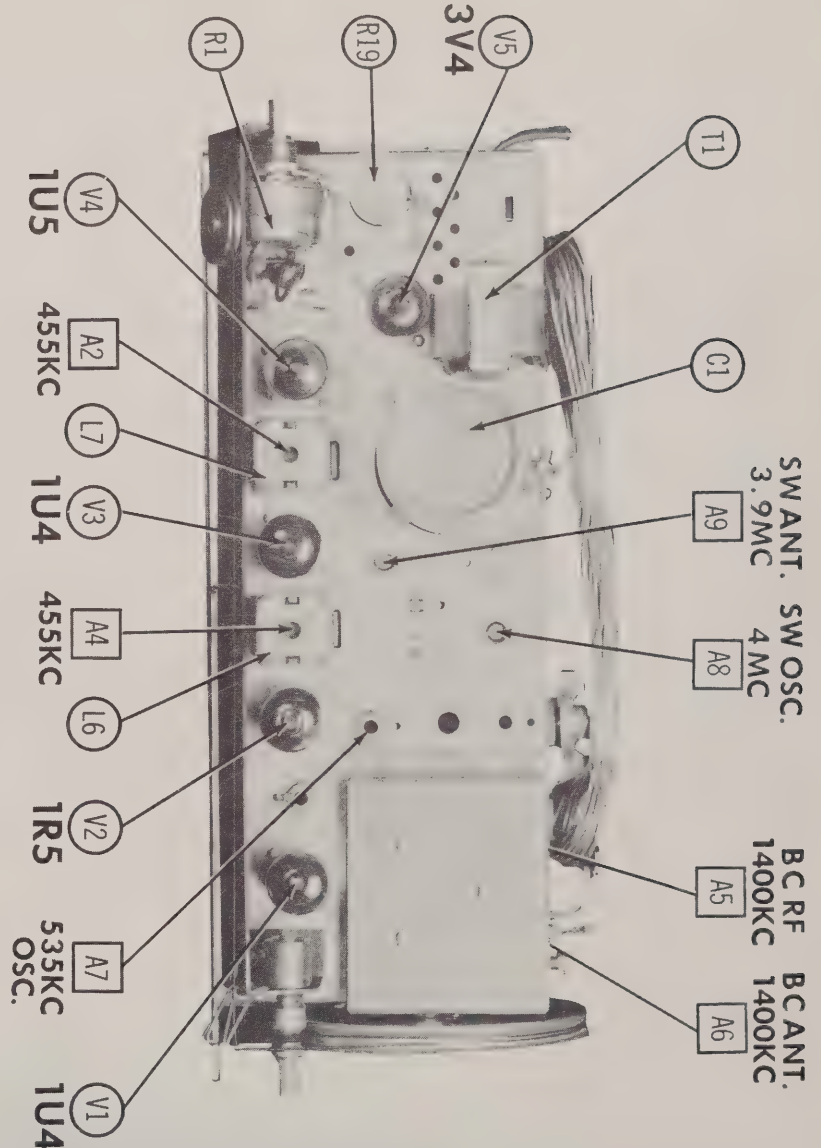
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg	½	18A621584	Q13-137	A47-1Meg-Z	B-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-2	SWE-20	Not Req.	US-27	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R2	220KΩ	½	6R6015	BTS-220K	
R3	5.6Meg	½	6R3988	BTS-5.6Meg	
R4	1 Meg	½	6R6004	BTS-1 Meg	
R5	33KΩ	½	6R6410	BTS-33K	
R6	2.2Meg	½	6R3927	BTS-2.2Meg	
R7	100KΩ	½	6R6031	BTS-100K	
R8	82Ω	½	6R2035	BTS-82	
R9	1500Ω	½	616161	BTS-1500	
R10	27KΩ	½	6R6434	BTS-27K	
R11	10KΩ	½	6R6320	BTS-10K	
R12	1 Meg	½	6R6004	BTS-1 Meg	
R13	10 Meg	½	6R2109	BTS-10 Meg	
R14	1 Meg	½	6R6004	BTS-1 Meg	
R15	1 Meg	½	6R6004	BTS-1 Meg	
R16A	10 Meg	½	♦21B621535	BTS-10 Meg	
B	4.7Meg	½		BTS-4.7Meg	
C	1 Meg	½		BTS-1 Meg	
D	3.3Meg	½		BTS-3.3Meg	
R17	220Ω	½	6R6270	BTS-220	
R18	1000Ω	½	6R6229	BTS-1000	
R19	2000Ω 5%	10	17B611589		
R20	820Ω	½	6R6269	BTS-820	
R21	150Ω	2.5	17A76986		

♦ Items R16A, R16B, R16C, R16D, C13A, C13B, C13C, C13D, C13E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	9. 8KΩ	3. 3Ω	25B621570A	A-3329 ①	A2932 ①	S-11X ①	Z1110 ①	TS-24S49①	① Bend mounting tabs down. File out slots. Mount on original mounting bracket.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6" x 9"	PM	3. 3Ω	50D621712			

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	BC Loop Ant.	2. 2Ω		24K621595				
L2	BC RF Coil	6. 5Ω	10Ω	24B611539				Sec. tapped @ 4. 8Ω
L3	SW Ant. Coil	1. 4Ω	3Ω	24A630890	14-1041 †		B-5495-A*	
L4	BC Osc. Coil	3. 4Ω	10Ω	24B621561			71-Osc.	
L5	SW Osc. Coil	1. 9Ω	2. 5Ω	24A630880			B-5495-C*	
L6	Input IF	24Ω	24Ω	24K600824	16-6758	BC-352	12-C1	
L7	Output IF	24Ω	24Ω	24K600824	16-6758	BC-353	12-C2	

† Drill mounting hole and disconnect C6; ground low side of secondary.
* Drill mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	MOTOROLA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.058ADC	48K692077	1003	RS75	6S75	75	5M4	

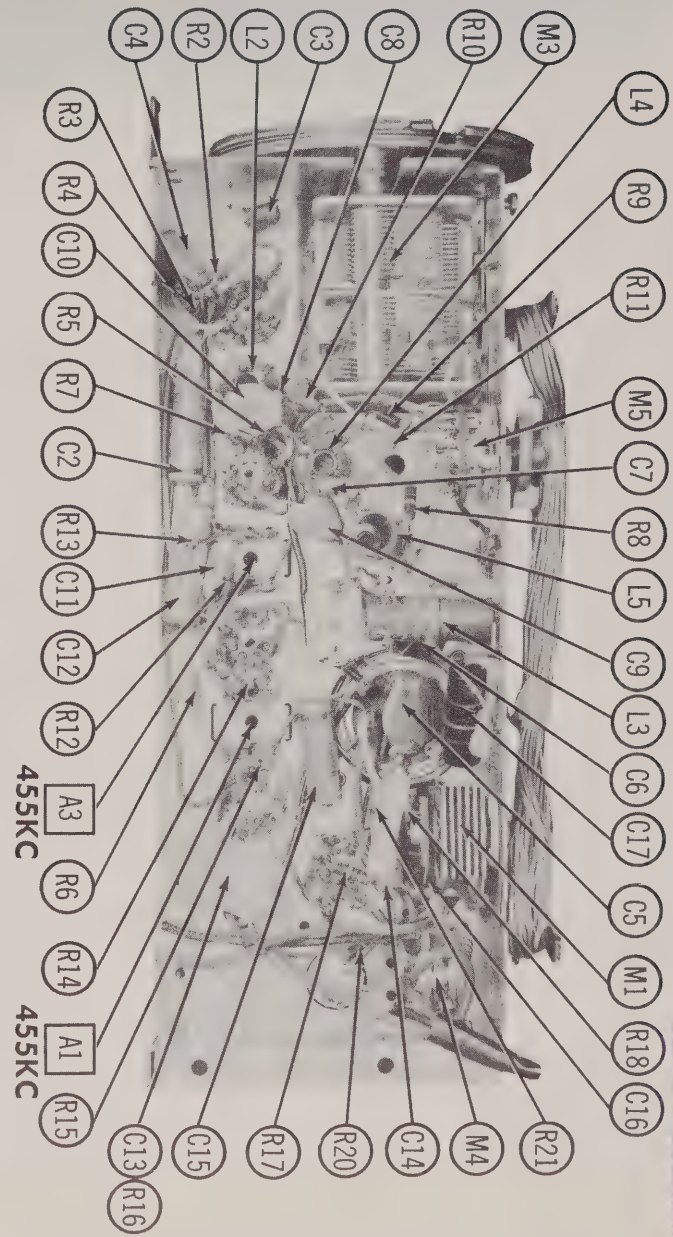
BATTERIES

ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	9V- "A" 90V "B"				756			T6Z60	

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Tuning Cap.	19C621583	(19-405MMF, 15-205MMF, 9-100MMF)
M4	Switch	40K630878	Power Changeover
M5	Switch	40B611599	Function, BC-Sw.
A8	Trimmer Cap.	20K621562	Sw. Osc. 2-18MMF
A9	Trimmer Cap.	20K621563	Sw. Ant. 2-18MMF
	Cabinet	16K621389	Less back and handle
	Cabinet Back	1V630335	Less loop
	Dial Crystal	61B621611	
	Handle	55K620029	Less spring
	Knob	36K621664	Volume (or) tuning
	Knob	36K472940	Band Selector

CHASSIS—BOTTOM VIEW



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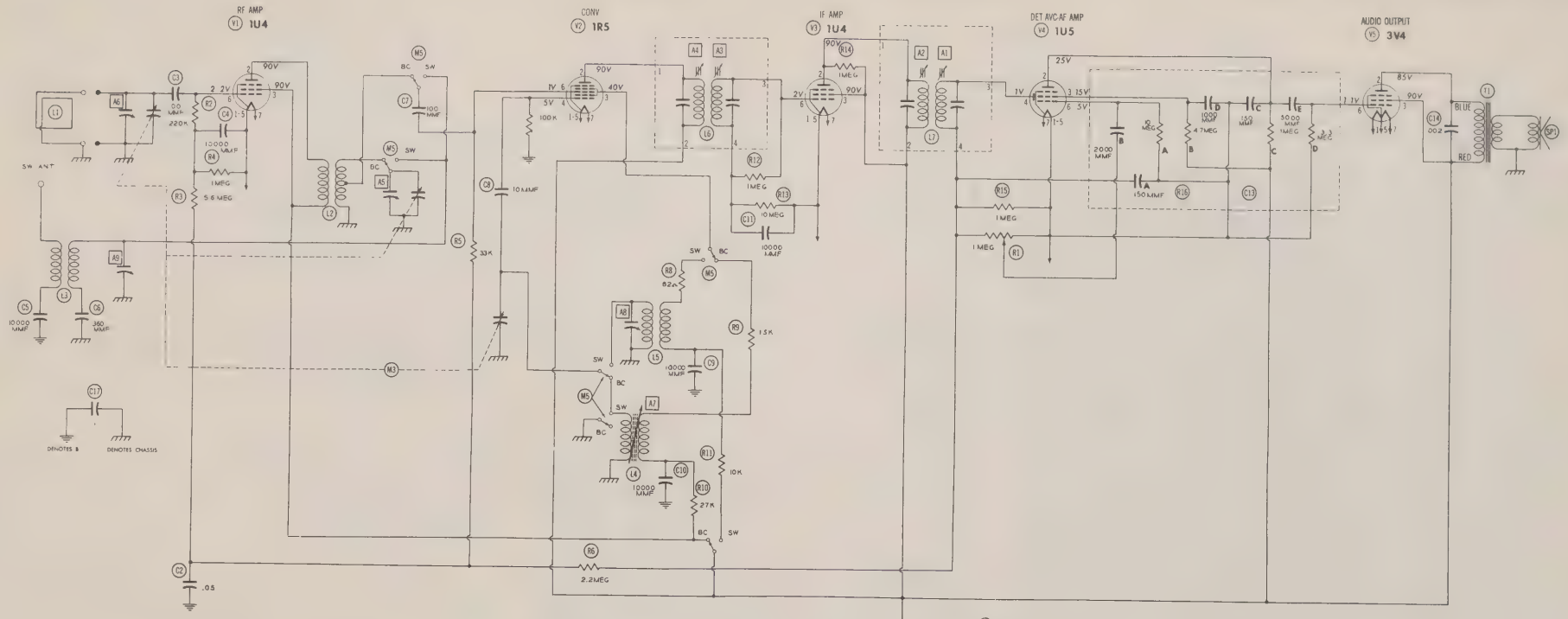
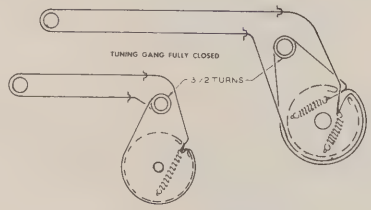
DENVER, COLORADO



THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE



DRIVE CORD STRINGING

REJSTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1U4	*	†975Ω	†970Ω	2.7Meg	*	1.2Meg	*
V 2	1R5	0Ω	†995Ω	†30KΩ	100KΩ	0Ω	2.7Meg	*
V 3	1U4	*	†995Ω	†970Ω	2.7Meg	*	10Meg	*
V 4	1U5	*	†1Meg	†4.7Meg	500KΩ	INF	10Meg	*
V 5	3V4	*	†1.4KΩ	†970Ω	INF	*	3.3Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
† MEASURED FROM OUTPUT OF M1

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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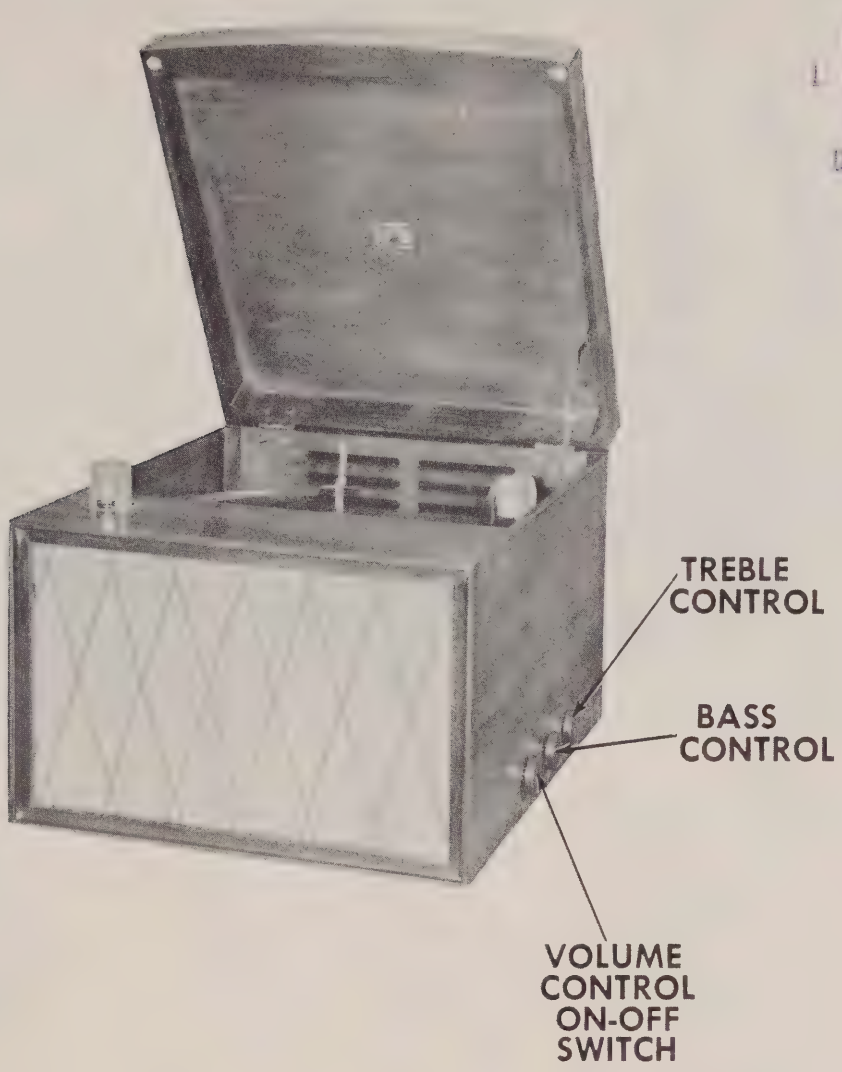
RCA VICTOR
MODEL 3-HES-5 (Ch. RS-146)



RCA VICTOR
MODEL 3-HES-5 (Ch. RS-146)

TRADE NAME	RCA Victor Model 3-HES-5 (Ch. RS-146)
MANUFACTURER	RCA Victor Div., Radio Corp. of America., Camden, N.J.
TYPE SET	AC Operated Phono Amplifier with 3 Speed Automatic Record Changer
TUBES (Four)	Types 6C4 Pre-Amp., 12AX7 AF Amp.-Phase Inv., (2) 50C5 Audio Output
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .34 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT 930800-4, -5 , SEE SIMILAR V-M MODEL 950 - PHOTOFACT SET 216 FOLDER 11 or RECORD CHANGER MANUAL CM-5.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		RCA Victor PART No.	STANDARD REPLACEMENT		
V1	Pre. Amplifier	6C4	6C4	6BG	
V2	AF Amplifier - Phase Inverter	12AX7	12AX7	9A	
V3	Audio Output	50C5	50C5	7CV	
V4	Audio Output	50C5	50C5	7CV	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	80	150	78617	PRS150/80-40		BBRT-84215		3N538	TVA-2460	Red
B	30	150		PRS150/10					TVA-1406	Green
C	10	150								Blue
C2	50	6	78573	PRS25/50		BBR50-6T		TC29	TVA-1100	
C3	.047	400	73553	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C4	.01	400	73561							
C5	1800		74850	SI1800		TP55		UC-5218	5GA-D18	
C6	.01	400	73561	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C7	.047	400	73553							
C8	.0015	600	76508							
C9	.012	200	59485							
C10	.047	200	73558							
C11	.047	400	73553							
C12	.047	400	73553							
C13	.1	400	73551	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C14	82		75785							Note 1
C15	.047	400	73533	489ZX-047	DF-503	PJ4S47		PT4147	4TM-S47	

Note 1. Not used in all models.

CONTROLS

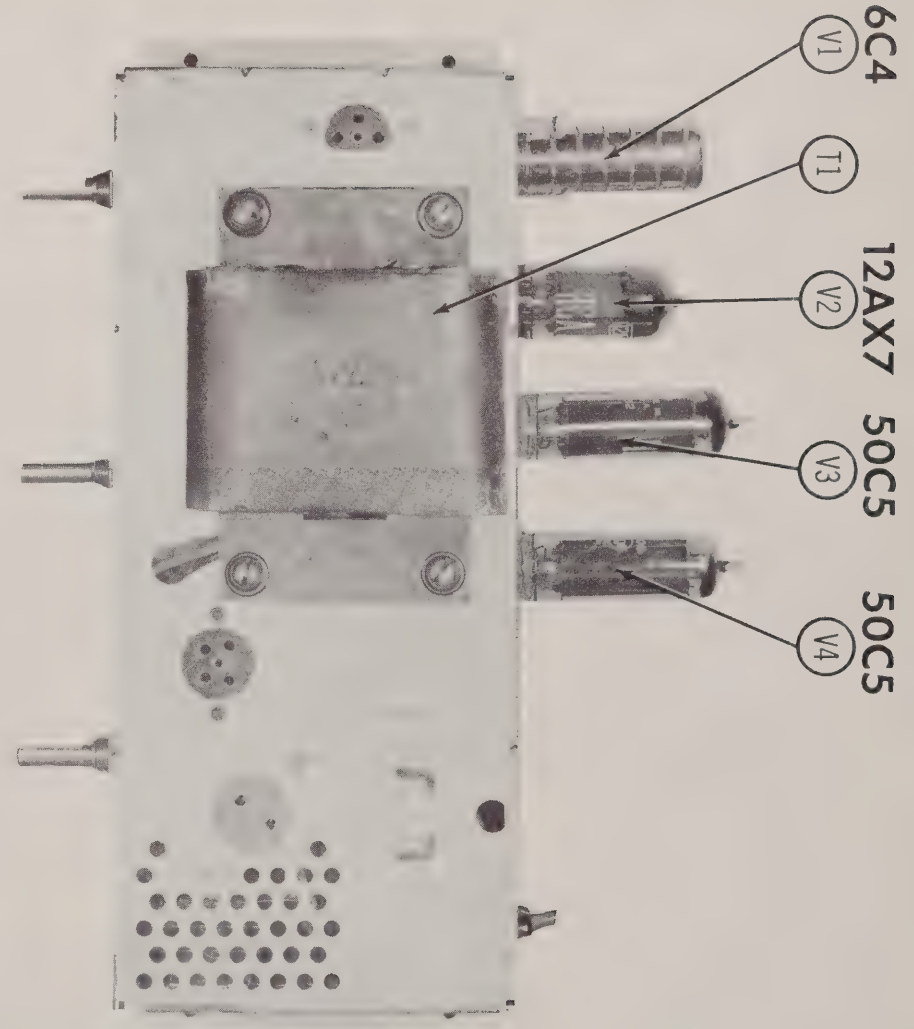
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	78588				UDT283	Volume tapped @ 160 & 80K
B	Switch		Not Req.				US-26	Attach to R1A
R2	2 Meg	½	78615	Q17-139				Bass
R3	100KΩ	½	78616					Treble

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R4	68KΩ	½	503368	BTS-68K	
R5	2.2Meg	½	503522	BTS-2.2Meg	
R6	3900Ω	½	503239	BTS-3900	
R7	47KΩ	½	503347	BTS-47K	
R8	47KΩ	½	503347	BTS-47K	
R9	220KΩ	½	503422	BTS-220K	
R10	22KΩ	½	503322	BTS-22K	
R11	8200Ω	½	503282	BTS-8200	
R12	6800Ω	½	503268	BTS-6800	
R13	220KΩ	½	503422	BTS-220K	
R14	6800Ω	½	503268	BTS-6800	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R15	39KΩ	½	503339	BTS-39K	
R16	220KΩ	½	503422	BTS-220K	
R17	18KΩ	½	503318	BTS-18K	
R18	470KΩ	½	503447	BTS-470K	
R19	82Ω	1	513082		
R20	470KΩ	½	503447	BTS-470K	
R21	10KΩ	½	503310	BTS-10K	
R22	33Ω	1	513033		
R23	1200Ω	1	513212	BTA-1200	
R24	100KΩ	½	503410	BTS-100K	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA RCA Victor PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	4.8KΩ	3.5Ω Tap @ .35Ω Res. SEC. 2 1.24Ω Res.	78587						

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA RCA Victor PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	8"	PM	3.5Ω	78597	ST-115 Mod. P8-V	8A6	

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA RCA Victor PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	NOTES
M1	.098A	78101	1101A	RS100	6S100A	100A	5M1	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA RCA Victor PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	SHURE PART No. CARTRIDGE	SHURE PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M2	78748					43	O-2 or S-2	

ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

PHONO NEEDLE

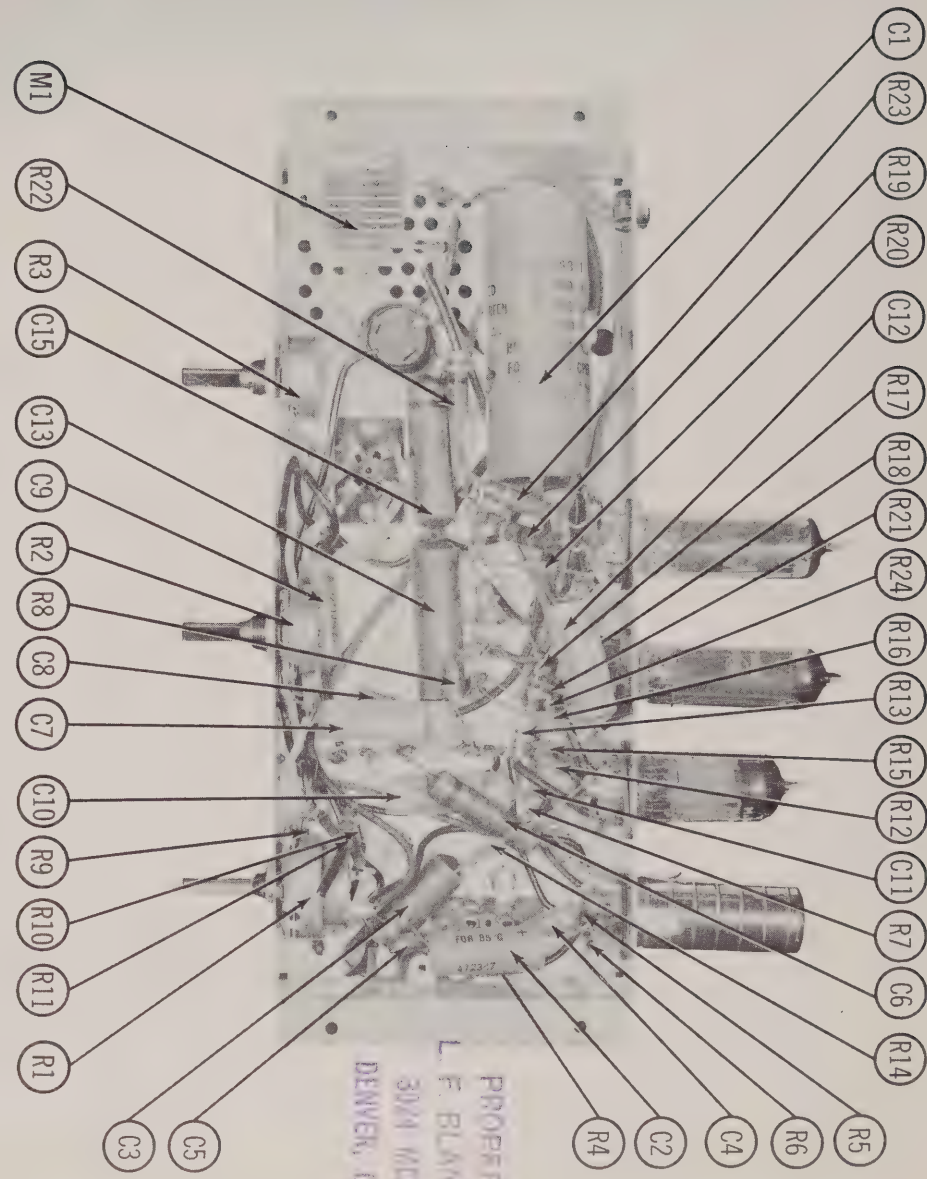
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA RCA Victor PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M3		† S-66	† AC-434 ♦† AC-434D1 †♦ AC-434D2 ♦ AC-434D	† W-75TPS	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M4	Switch	78618	Speaker
	Knob	77735	Speaker switch - brown
	Knob	77736	Speaker switch - med. beige
	Knob	78576	Volume or tone - maroon
	Knob	78577	Volume or tone - med. beige

CHASSIS—BOTTOM VIEW



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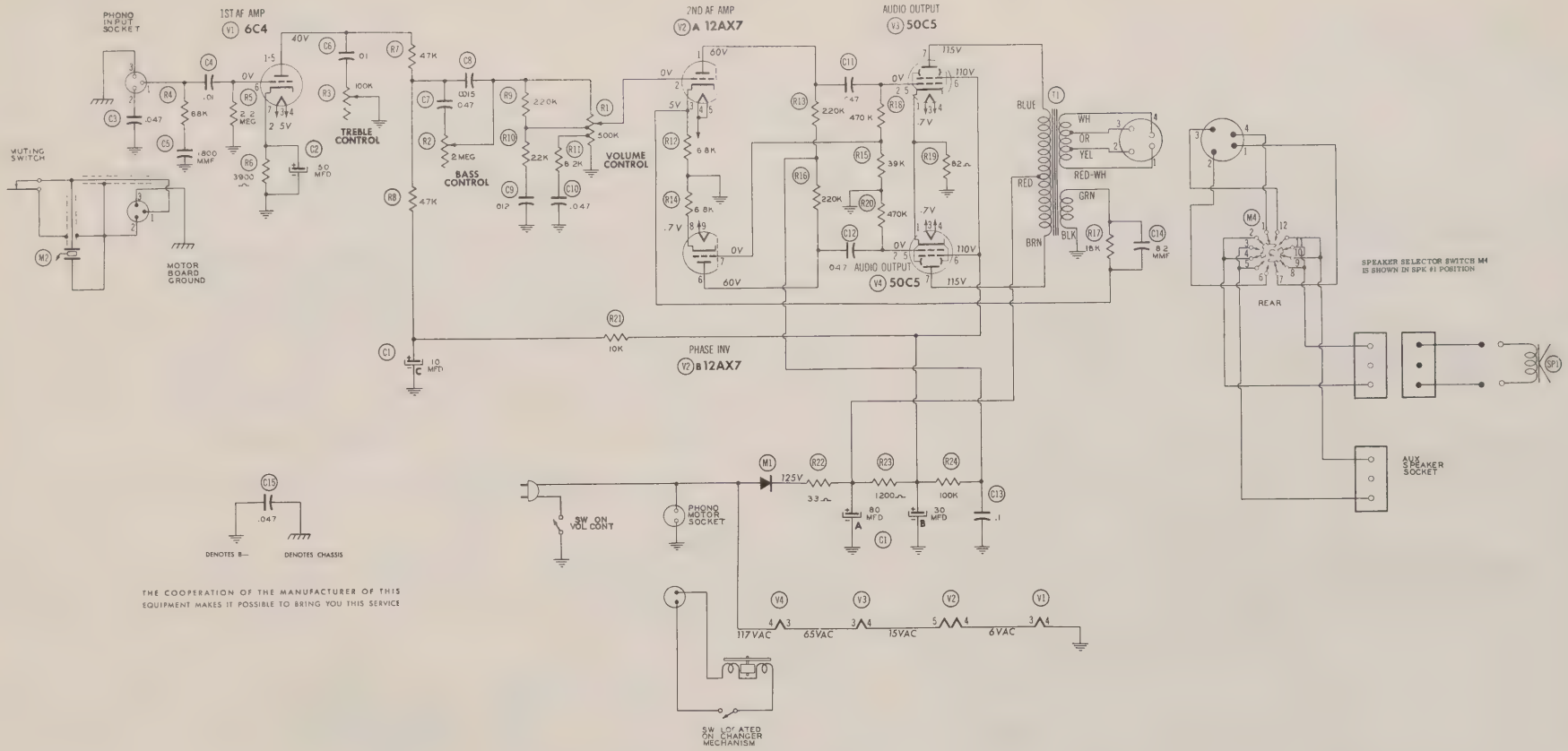
RCA VICTOR
MODEL 3-HES-5 (Ch. RS-146)



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6C4	†105KΩ	0Ω	7Ω	0Ω	†105KΩ	2.2Meg	3.9KΩ		
V 2	12AX7	†320KΩ	200KΩ	6.8KΩ	7Ω	21Ω	†320KΩ	39KΩ	6.8KΩ	14Ω
V 3	50C5	82Ω	510KΩ	71Ω	21Ω	510KΩ	†1.2KΩ	†180Ω		
V 4	50C5	82Ω	470KΩ	71Ω	125Ω	470KΩ	†1.2KΩ	†180Ω		

† MEASURED FROM OUTPUT OF M1

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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3924 MEADE ST.

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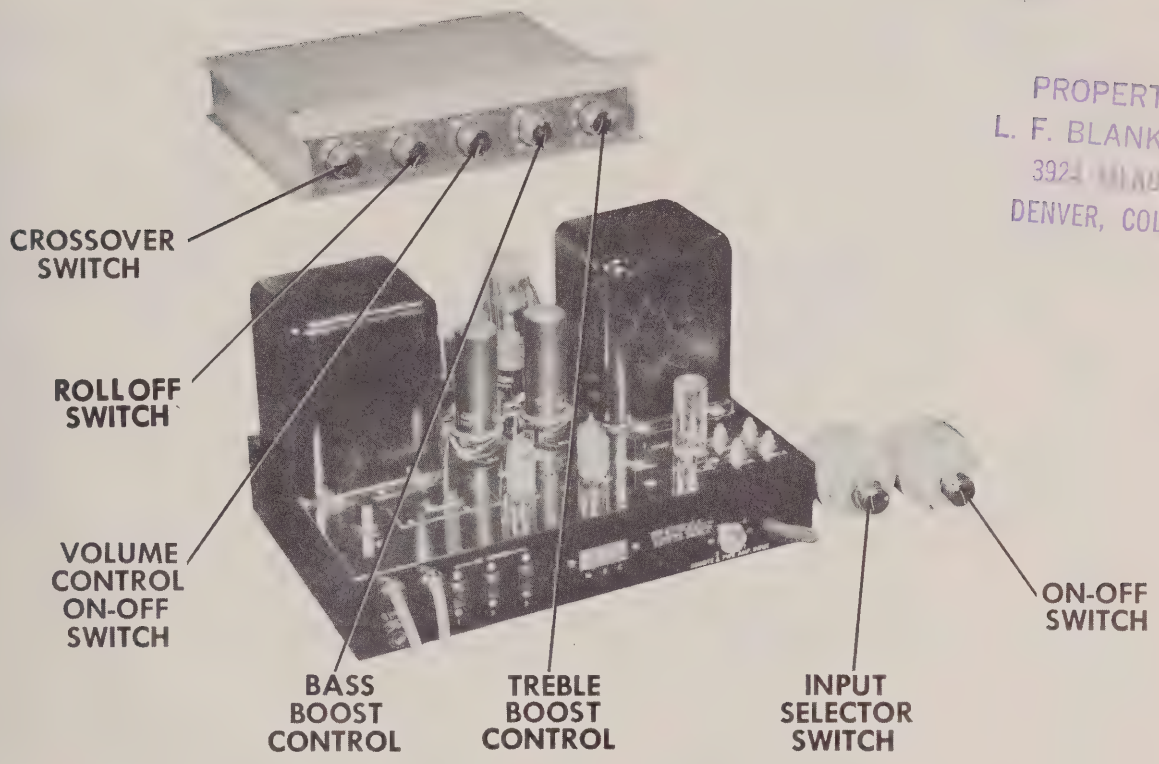
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

RAULAND
MODEL 1826 (1801A, 1805A)



RAULAND
MODEL 1826 (1801A, 1805A)

TRADE NAME	Rauland Model 1826 Comprised of 1801A (Remote Control) & 1805A (Power Amplifier)		
MANUFACTURER	Rauland-Borg Corp., 3515 W. Addison, Chicago 18, Ill.		
TYPE SET	AC Operated 4 Channel 20 Watt Audio Amplifier and Remote Control		
TUBES	1801A Remote Control - (3) 12AX7 1805A Power Amplifier - (2) 12AX7, (1) 12AU7, (2) 6L6, (1) 5U4G, (1) 5Y3GT		
POWER SUPPLY	110-120 Volts AC	RATINGS	.98 Amp. @ 117 Volts AC (Power Amp.) .14 Amp. @ 117 Volts AC (Remote Control)

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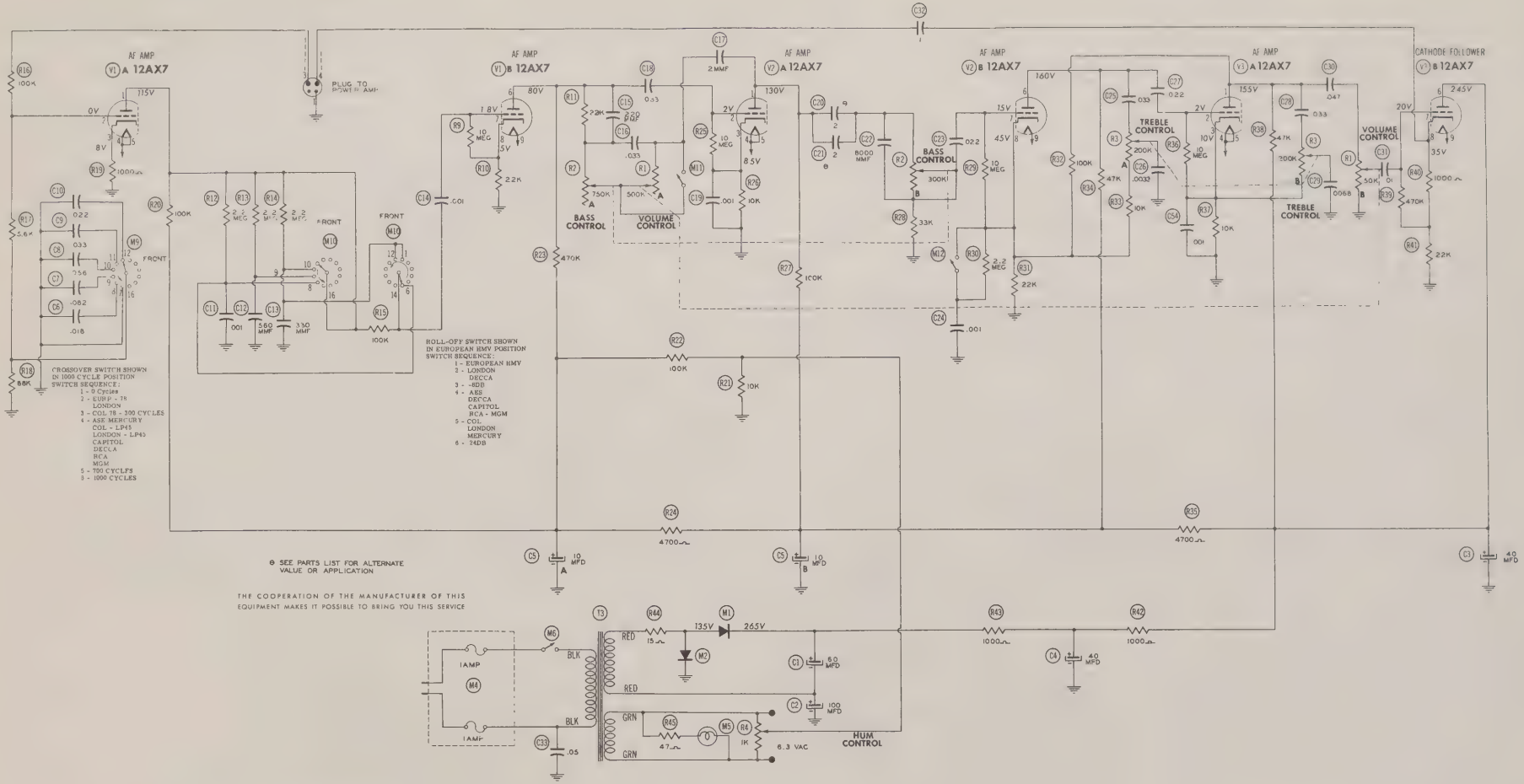

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	▲110KΩ	74KΩ	1KΩ	10KΩ	10KΩ	▲480KΩ	10Meg	22KΩ	10KΩ
V 2	12AX7	▲110KΩ	10Meg	10KΩ	10KΩ	10KΩ	▲54KΩ	10Meg	22KΩ	10KΩ
V 3	12AX7	▲49KΩ	10Meg	10KΩ	10KΩ	10KΩ	▲2KΩ	490KΩ	23KΩ	10KΩ

♦ MEASURED FROM OUTPUT OF M1

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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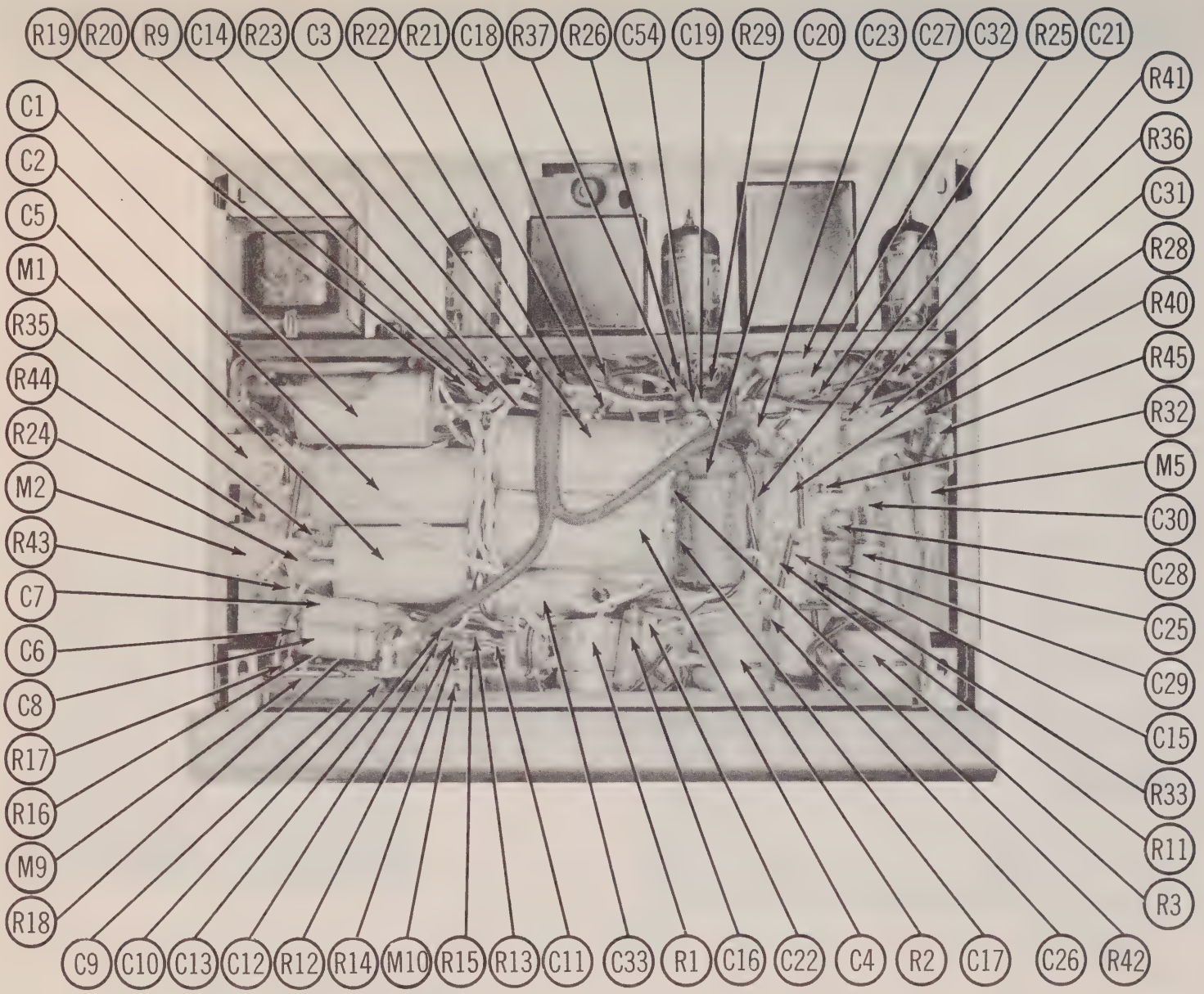
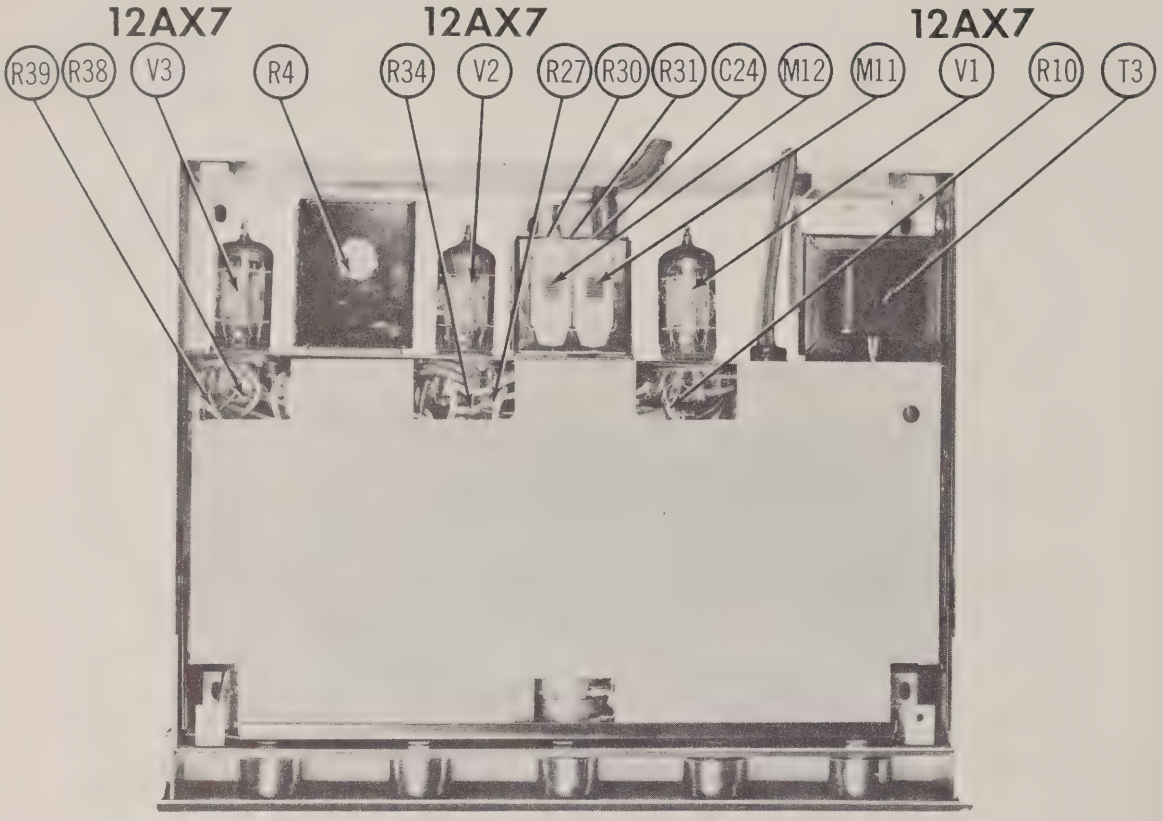
251-15

MODEL 1801A—REMOTE CONTROL

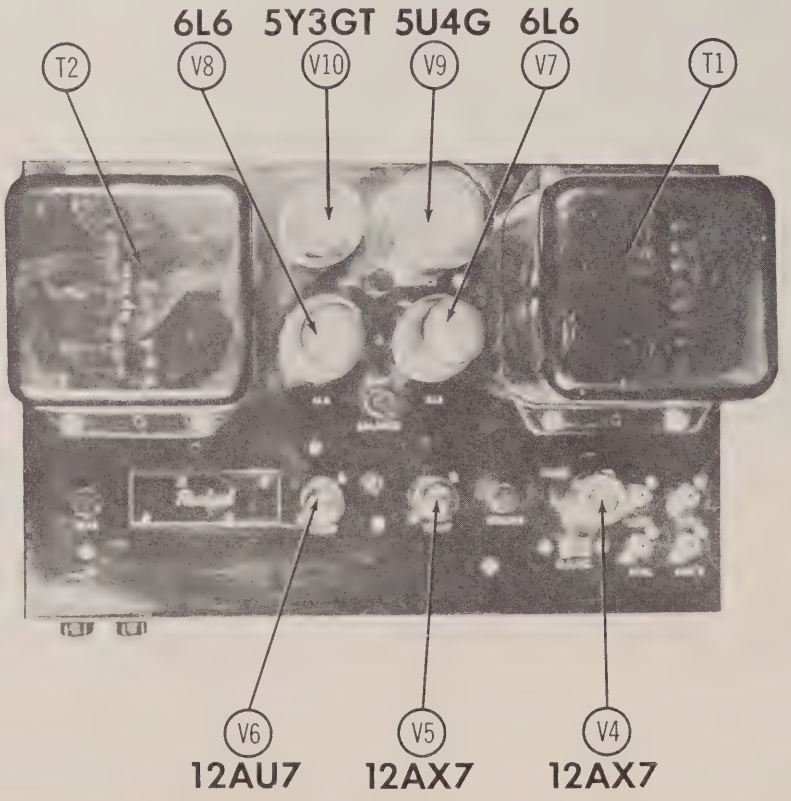


MODEL 1801A—REMOTE CONTROL

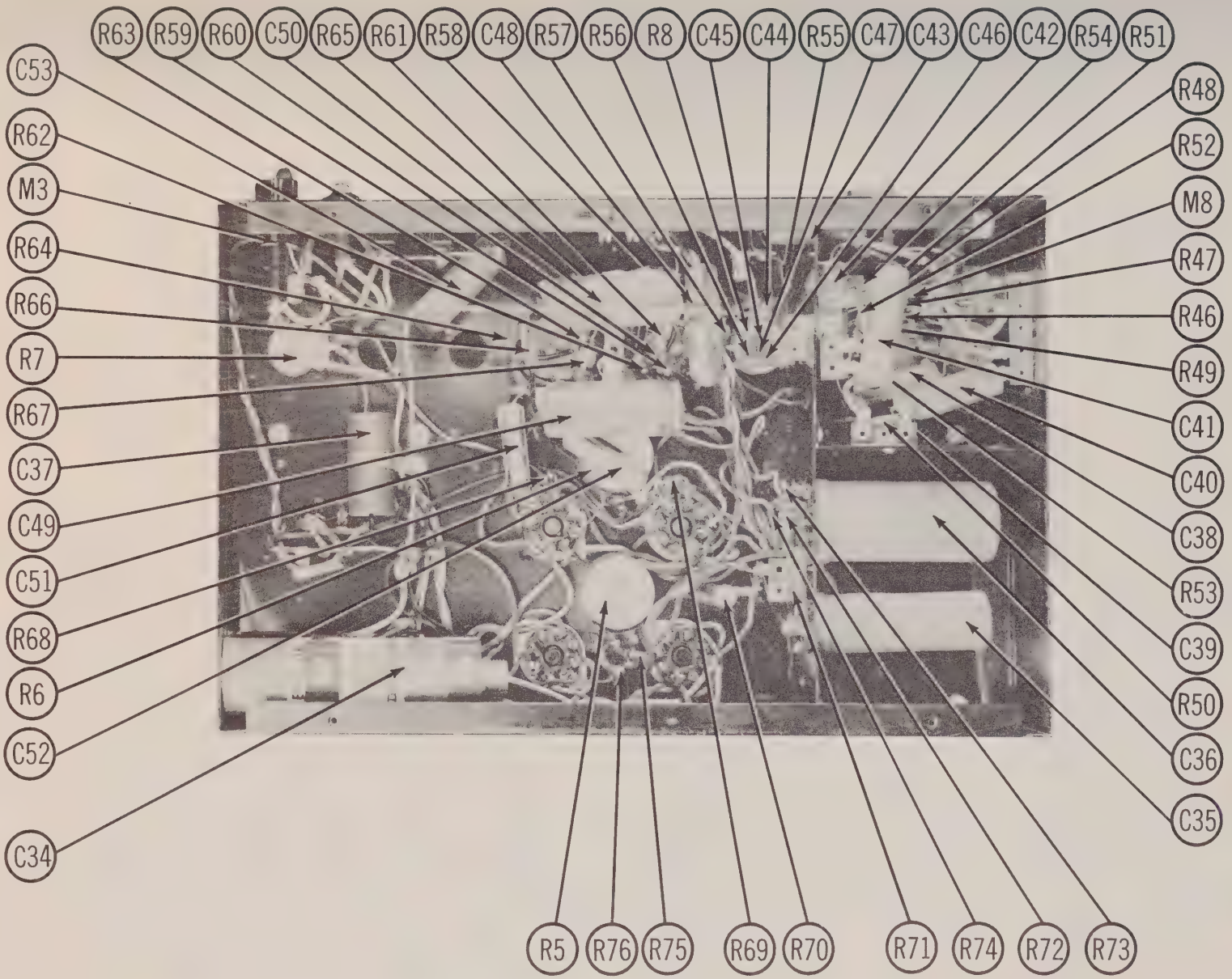
RAULAND
MODEL 1826



MODEL 1801A–REMOTE CONTROL



MODEL 1805A–POWER AMP.



MODEL 1805A – POWER AMP.

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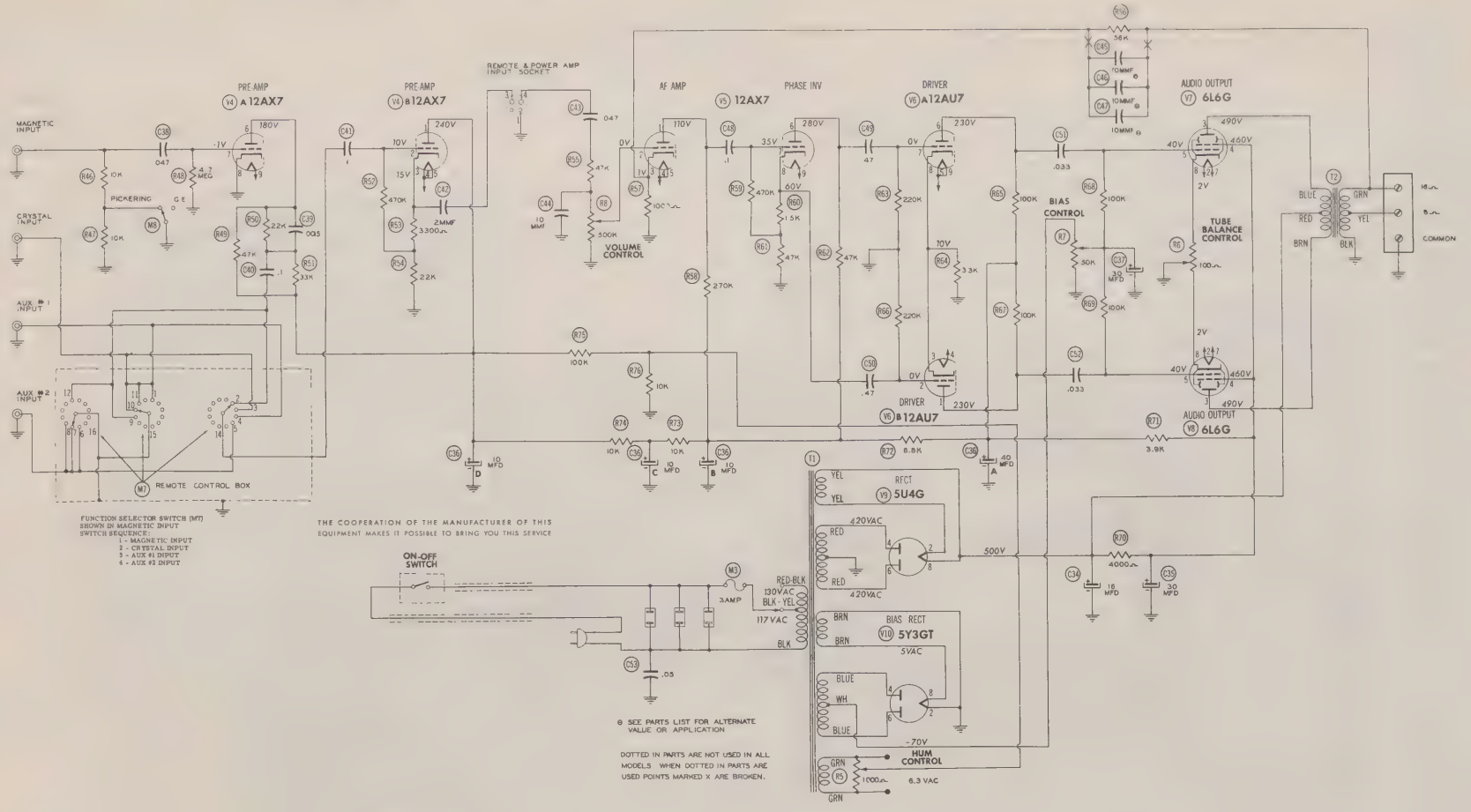
3074 MEADE ST.
DENVER, COLORADO


PRE-AMP V4 A 12AX7
PRE-AMP V4 B 12AX7
REMOTE & POWER AMP INPUT SOCKET
AF AMP V5 12AX7
PHASE INV
DRIVER V6 A 12AU7
DRIVER V6 B 12AU7
AUDIO OUTPUT V7 6L6G
AUDIO OUTPUT V8 6L6G
MAGNETIC INPUT
CRYSTAL INPUT
AUX #1 INPUT
AUX #2 INPUT
PICKERING
VOLUME CONTROL
BIAS CONTROL
TUBE BALANCE CONTROL
REMOTE CONTROL BOX
FUNCTION SELECTOR SWITCH (M7) SHOWN IN MAGNETIC INPUT SWITCH SEQUENCE:
1 - MAGNETIC INPUT
2 - CRYSTAL INPUT
3 - AUX #1 INPUT
4 - AUX #2 INPUT
THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
ON-OFF SWITCH
RECT V9 5U4G
BIAS RECT V10 5Y3GT
HUM CONTROL
COMMON
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DOTTED IN PARTS ARE NOT USED IN ALL MODELS WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 4	12AX7	†35KΩ	490KΩ	23KΩ	10KΩ	10KΩ	†65KΩ	4.7Meg	0Ω	10KΩ
V 5	12AX7	†285KΩ	200KΩ	1KΩ	10KΩ	10KΩ	†62KΩ	520KΩ	48KΩ	10KΩ
V 6	12AU7	†110KΩ	220KΩ	3.3KΩ	10KΩ	10KΩ	†110KΩ	220KΩ	3.3KΩ	10KΩ
V 7	6L6	0Ω	10KΩ	†100Ω	†4KΩ	130KΩ	30KΩ	10KΩ	50Ω	
V 8	6L6	0Ω	10KΩ	†100Ω	†4KΩ	130KΩ	30KΩ	10KΩ	50Ω	
V 9	5U4G	INF	100KΩ	INF	50Ω	†35KΩ	50Ω	INF	100KΩ	
V 10	5Y3GT	0Ω	0Ω	INF	30Ω	INF	30Ω	INF	.1Ω	

† MEASURED FROM PIN 8 OF V9

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements

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251-15

MODEL 1805A – POWER AMP.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: RAULAND PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	AF Amplifier	12AX7	12AX7	9A	
V2	AF Amplifier	12AX7	12AX7	9A	
V3	AF Amplifier-Cathode Follower	12AX7	12AX7	9A	
V4	Pre. Amplifier	12AX7	12AX7	9A	
V5	AF Amplifier - Phase Inverter	12AX7	12AX7	9A	
V6	Driver	12AU7	12AU7	9A	
V7	Output	6L6	6L6	7S	
V8	Output	6L6	6L6	7S	
V9	Rectifier	5U4G	5U4G	5T	
V10	Bias Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	RAULAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	60	150		PRS150/30-30		BR6015		TCD47	TVA-2421	
C2	100	150		PRS150/100		BR10015			TVA-1420	
C3	40	350		PRS450/40		BR4035		TC78	TVA-1613	
C4	40	350		PRS450/40		BR4035		TC78	TVA-1613	
C5A	10	350		PRS450/10-10		BBRD1145		TCD62	TVA-2722	Red
B	10	350								
C6	.018	200				PM4S18				
C7	.082	200				PM4S82				
C8	.056	200				PM4S56				
C9	.033	200		P488-033		PM4S33		PT4133		
C10	.022	200		P488-022		PJ4S22		PT4122		
C11	.001	200		P688-001	D6-102	CUB6D1	GP2-333-103	PT621	4TM-S22	
C12	560	500				1R5T56				
C13	330	500				5R5T33				
C14	.001	600		P688-001	D6-102	CUB6D1	GP2-333-103	PT621	6TM-D1	
C15	220	500				22R5T22				
C16	.033	200		P488-033		PM4S33		PT4133		
C17	2	400								
C18	.033	400		P488-033		PM4S33		PT4133		
C19	.001	600		P688-001	D6-102	CUB6D1	GP2-333-103	PT621	6TM-D1	
C20	.2	600		P688-22		CUB6P22		PT402	6TM-P2	Note 1
C21	.2	600		P688-22		CUB6P22		PT402	6TM-P2	Note 1
C22	8000	500		1467-008	D6-802	1DR3D8	GP2-333-802	MC471	1FM-28	
C23	.022	400		P488-022		CUB4S22		PT4122	4TM-S22	
C24	.001	600		P688-001	D6-102	CUB6D1	GP2-333-103	PT621	6TM-D1	
C25	.033	600		P688-033		PM6S33		PT4133		
C26	.0033	600		P688-0033	D6-332	CUB6D33	GP2-333-332	PT6233	6TM-D33	
C27	.022	600		P688-022		CUB6S22		PT6122	6TM-S22	
C28	.033	600		P688-033		PM6S33		PT6133		
C29	.0068	600		P688-0068	D6-682	CUB6D68	GP2-333-682		6TM-D68	
C30	.047	600		P688-047		CUB6S47		PT6147	6TM-S47	
C31	.01	600		P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C32	.1	600		P688-01		CUB6P1		PT601	6TM-P1	
C33	.05	600		689ZX-05		PJ6S5		PT615	6TM-S5	
C34	16	600	CE166J	GL600/16		KR616C		HS696	AP-16	
C35	30	500	CE306B	AFH1-60		A054			TVL-1810	
C36A	▲40	450	CE706A	AFH4-17		D016		FP434.5 TC75	R1442	
B	■10	450								
C	10	450								
D	10	450								
C37	30	150	CE306D	PRS150/30		BR3015		TC47	TVA-1412	
C38	.047	600		P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C39	.0015	600		P688-0015	D6-152	PM6D15	GP2L-152	PT6215	6TM-D15	
C40	.1	600		P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C41	.1	600		P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C42	20	600								
C43	.047	600		P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C44	10			SI10	D6-100	TP09	GP2K-100	UC-541	5GA-Q1	
C45	10			SI10	D6-100	TP09	GP2K-100	UC-541	5GA-Q1	Note 2
C46	10			SI10	D6-100	TP09	GP2K-100	UC-541	5GA-Q1	Note 2

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	RAULAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C47	10			SI10	D6-100	TP09	GP2K-100	UC-541	5GA-Q1	Note 2
C48	.1	600		P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C49	.47	600		P688-5		CUB6P5		PT605	6TM-P5	
C50	.47	600		P688-5		CUB6P5		PT605	6TM-P5	
C51	.033	600		P688-033		PM6S33		PT6133	6TM-S33	
C52	.033	600		P688-033		PM6S33		PT6133	6TM-S33	
C53	.05	600		689ZX-05		PJ6S5		PT615	6TM-S5	
C54	.001	600		P688-001	D6-102	PJ6S1	GP2L-102	PT621	6TM-D1	

Note 1. Some models use a .4MFD @ 600V in this application.
Note 2. Some models use a 33MMF in this application.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	RAULAND PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	RP554					Volume & switch
B	50KΩ	½						
R2A	750KΩ	½	RP115					Bass
B	300KΩ	½						
R3A	200KΩ	½	RP404					Treble
B	200KΩ	½						
R4A	1000Ω	2	RPW-102B	WK-1000	A43-1000	VK-129	R1000L	Hum balance
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R4A
R5A	1000Ω	2	RPW-102B	WK-1000	A43-1000	VK-129	R1000L	Hum balance
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R5A
R6A	100Ω	2	RPW-101B	W-100	A43-100	VK-121	R100L	Tube balance
B	Shaft		Not Req.	Not Req.	Not Req.	Not Req.	Not Req.	Attach to R6A
R7A	50KΩ	½	RP-503C-B	QI1-123	A47-50K-S	AB-31	U-35	Bias
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8A	500KΩ	½	RP-504B-D	QI3-133	A47-500K-Z	BSK-60	U-48	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R8A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	RAULAND PART No.	IRC PART No.	NOTES
R9	10 Meg	½		BTS-10 Meg	
R10	22KΩ	½		BTS-22K	
R11	22KΩ	½		BTS-22K	
R12	2. 2Meg	½		BTS-2. 2Meg	
R13	2. 2Meg	½		BTS-2. 2Meg	
R14	2. 2Meg	½		BTS-2. 2Meg	
R15	100KΩ	½		BTS-100K	
R16	100KΩ	½		BTS-100K	
R17	5600Ω	½		BTS-5600	
R18	68KΩ	½		BTS-68K	
R19	1000Ω	½		BTS-1000	
R20	100KΩ	½		BTS-100K	
R21	10KΩ	½		BTS-10K	
R22	100KΩ	½		BTS-100K	
R23	470KΩ	½		BTS-470K	
R24	4700Ω	½		BTS-4700	
R25	10 Meg	½		BTS-10 Meg	
R26	10KΩ	½		BTS-10K	
R27	100KΩ	½		BTS-100K	
R28	33KΩ	½		BTS-33K	
R29	10 Meg	½		BTS-10 Meg	
R30	2. 2Meg	½		BTS-2. 2Meg	
R31	22KΩ	½		BTS-22K	
R32	100KΩ	½		BTS-100K	
R33	10KΩ	½		BTS-10K	
R34	47KΩ	½		BTS-47K	
R35	4700Ω	½		BTS-4700	
R36	10 Meg	½		BTS-10 Meg	
R37	10KΩ	½		BTS-10K	
R38	47KΩ	½		BTS-47K	
R39	470KΩ	½		BTS-470K	
R40	1000Ω	½		BTS-1000	
R41	22KΩ	½		BTS-22K	
R42	1000Ω	½		BTS-1000	

ITEM No.	RATING: OHMS	RATING: WATT	RAULAND PART No.	IRC PART No.	NOTES
R43	1000Ω	½		BTS-1000	
R44	15Ω	2			
R45	47Ω	½		BTS-47	
R46	10KΩ	½		BTS-10K	
R47	10KΩ	½		BTS-10K	
R48	4. 7Meg	½		BTS-4. 7Meg	
R49	47KΩ	½		BTS-47K	
R50	22KΩ	½		BTS-22K	
R51	33KΩ	½		BTS-33K	
R52	470KΩ	½		BTS-470K	
R53	3300Ω	½		BTS-3300	
R54	22KΩ	½		BTS-22K	
R55	47KΩ	½		BTS-47K	
R56	56KΩ	½		BTS-56K	
R57	1000Ω	½		BTS-1000	
R58	270KΩ	½		BTS-270K	
R59	470KΩ	½		BTS-470K	
R60	1500Ω	½		BTS-1500	
R61	47KΩ	½		BTS-47K	
R62	47KΩ	½		BTS-47K	
R63	220KΩ	½		BTS-220K	
R64	3300Ω	½		BTS-3300	
R65	100KΩ	2		BTB-100K	
R66	220KΩ	½		BTS-220K	
R67	100KΩ	2		BTB-100K	
R68	100KΩ	½		BTS-100K	
R69	100KΩ	½		BTS-100K	
R70	4000Ω	10		1 3/4A-4000	
R71	3900Ω	2		BTB-3900	
R72	6800Ω	2		BTB-6800	
R73	10KΩ	½		BTS-10K	
R74	10KΩ	½		BTS-10K	
R75	100KΩ	½		BTS-100K	
R76	10KΩ	½		BTS-10K	

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	RAULAND PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ .98A	840VCT .083ADC	158VCT .0017ADC	LO-0232						
	SEC. 3	SEC. 4	SEC. 5							
	5VAC @ 3A	5VAC @ 2A	6.3VAC @ 2.9A							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RAULAND PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	5.3KΩ CT	16Ω Tap @ 8Ω	LO-0130-D	A-8053 ①		S-35 ①	H4101 ①		① Drill new mounting holes.

TRANSFORMER REMOTE CONTROL

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	RAULAND PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T3	117VAC @ .14A	127VAC .011ADC	6.3VAC @ 1A		LP-0233-B				P9100	T-22R12

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	RAULAND PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.011A	JR-0019		CR30	8S35	35	8Y1	
M2	.011A	JR-0019		CR30	8S35	35	8Y1	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			RAULAND PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	3AG	3 Amp.			312003. (3AG-3A)	341001	AGC3	HKP
M4	3AG	1 Amp.			312001 (3AG-1A)		AGC1	

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	RAULAND PART No.	NOTES
M5	Dial light		# 47 bayonet
M6	Switch		Off-on
M7	Switch		Input selector
M8	Switch		G. E.-Pickering (phono pickup selector)
M9	Switch		Crossover
M10	Switch		Roll-off
M11	Switch		Bass-equal loudness
M12	Switch		Treble-equal loudness

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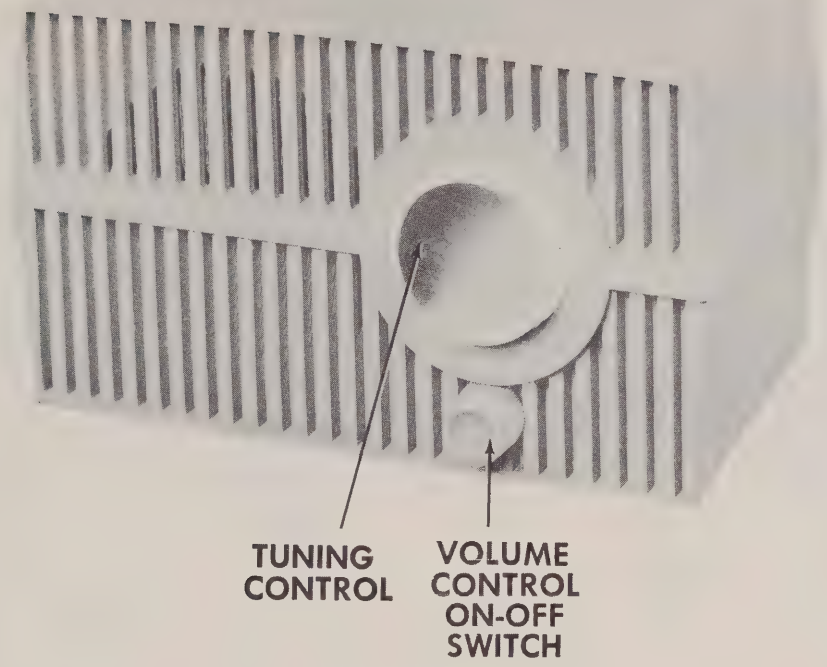
SONORA
MODELS 341, 349, 356



SONORA
MODELS 341, 349, 356

TRADE NAME	Sonora Models 341, 349, 356
MANUFACTURER	Sonora Radio & Tel. Corp., 325 N. Hoyne Ave., Chicago, Ill.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Four)	Types 12AU6 Conv., 12AV6 Det.-AF Amp., 50C5 Audio Output, 35Z5GT Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING .26 Amp. @ 117 Volts AC
TUNING RANGE--BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial. Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna stator lug on tuning gang. Low side to B-	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A4	"
4.		"	600KC	Tune to 600KC signal	"		Bend slotted antenna rotor plates for maximum output. Repeat step 3.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12AU6	12AU6	7BK	
V2	Det-AF Amp.	12AV6	12AV6	7BT	
V3	Output	50C5	50C5	7CV	
V4	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SONORA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	40	150	N-8442	PRS150/40-20-20		BBRT42215		TV129	TVA-3423	Blue
B	20	150								Red
C	20	15								Green
C2	50		N-6885	SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C3	100		N-6015	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C4	.003	600	N-2063	P688-003	D6-302	CUB6D3	GP2-333-302	PT623	6TM-D3	
C5A	5000		♦N-8215	♦PP-112-2	♦PC-71	♦112TM2	♦1406-02		♦T-4	
B	250									
C										
C6	.01	400	N-1344	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C7	.05	400	N-1346	489ZX-05	DF-503	PJ4S5		PT415	4TM-S5	
C8	.05	200	N-1345	P288-05	DF-503	PJ2S5		PT415	2TM-S5	

♦ Items C5A, C5B, C5C, R4A and R4B are combined in one unit.
When replacing items separately, C5B and C5C should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SONORA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2 Meg	½	N-7142		A47-2Meg-Z	AB-76	U-55	Volume
B	Shaft		Not Req.		KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.		SWE-12	KB-1	US-27	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	2.2Meg	½	N-4277	BTS-2.2Meg	
R3	6.8Meg	½	N-4028	BTS-6.8Meg	
R4A	250KΩ	½	♦N-8215	BTS-250K	
B	470KΩ	½		BTS-470K	

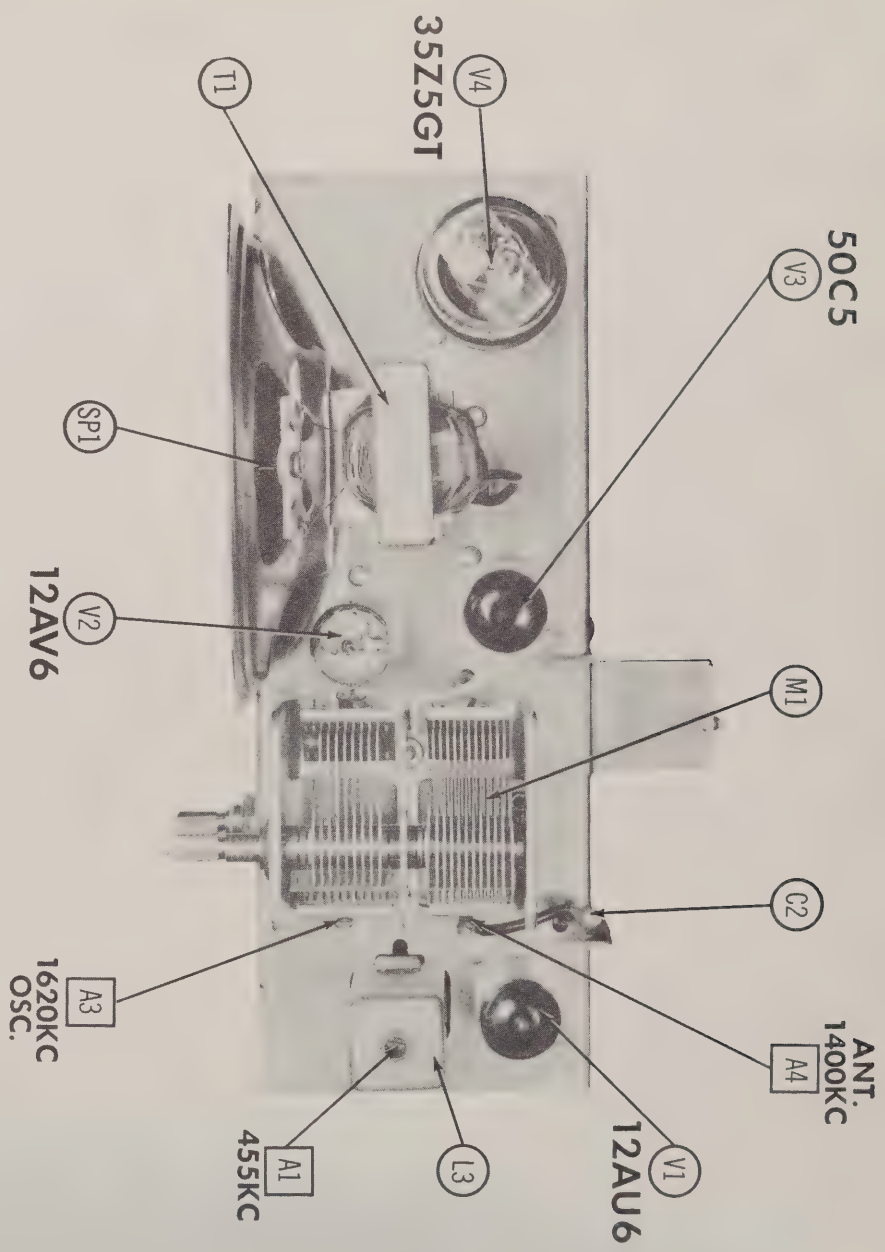
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R5	180Ω	½	N-4067	BTS-180	
R6	68Ω	2	N-6014		
R7	2200Ω	½	N-4896	BTS-2200	
R8	33Ω	½	N-4022	BTS-33	

♦ Items C5A, C5B, C5C, R4A. R4B are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: SONORA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.74KΩ	3.5Ω	Part of spkr.	A-3332	A-3025	S-12X	Z1101		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	SONORA PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.5Ω	N-7824	ST-113 Mod. P4-X	4A07	

COILS (RF-IF)

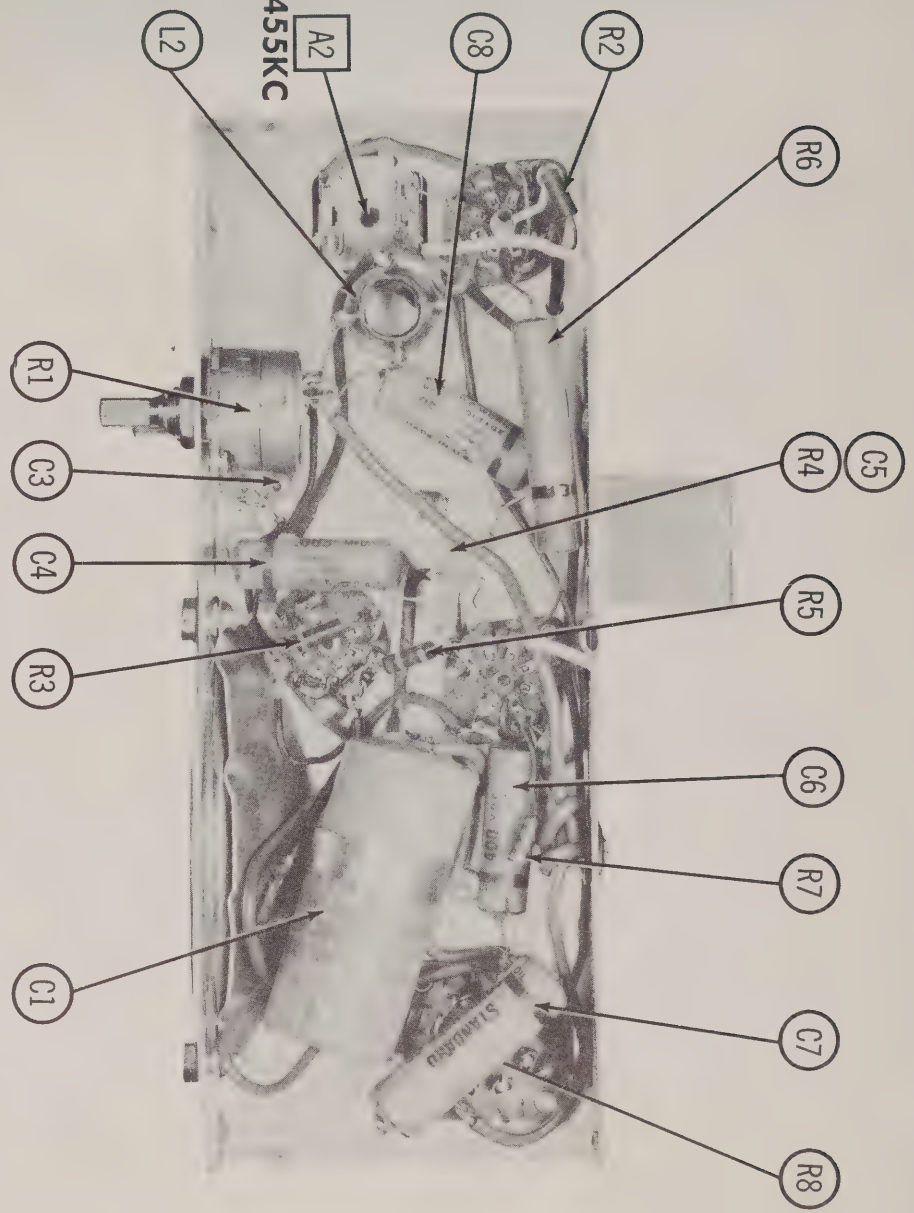
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SONORA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2.1Ω		N-8456				Includes cabinet back
L2	Osc. Coil	1Ω	7.5Ω	N-8552				Pickup winding= 2.4Ω
L3	IF Trans.	28Ω	28Ω	N-7694	16-6758 †	BC-353 †	12-C2 †	Pri. tapped @ 1.1Ω

† Connect B+ line to pin 6 of V1.

MISCELLANEOUS

ITEM No.	PART NAME	SONORA PART No.	NOTES
M1	Tuning cap	N-8508	(62-410MMF, 45-150MMF)

CHASSIS—BOTTOM VIEW



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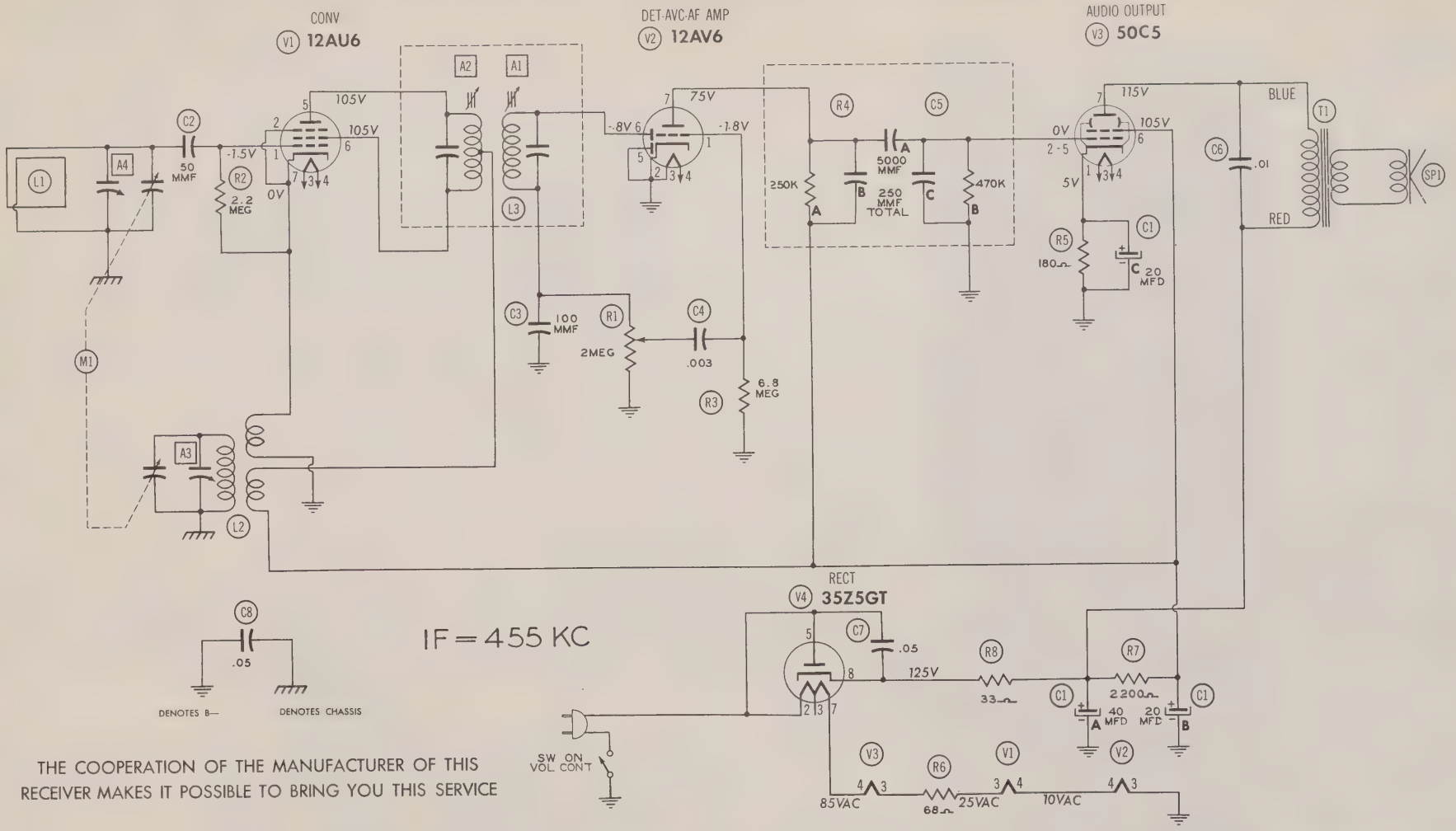

IF = 455 KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12AU6	2.2Meg	1Ω	25Ω	13Ω	†2.2KΩ	†2.2KΩ	1Ω	
V 2	12AV6	6.8Meg	0Ω	0Ω	13Ω	0Ω	2Meg	†220KΩ	
V 3	50C5	180Ω	470KΩ	95Ω	145Ω	470KΩ	†2.2KΩ	†250Ω	
V 4	35Z5GT	INF	180Ω	170Ω	INF	180Ω	†33Ω	145Ω	200KΩ

† MEASURED FROM PIN 8 OF V4

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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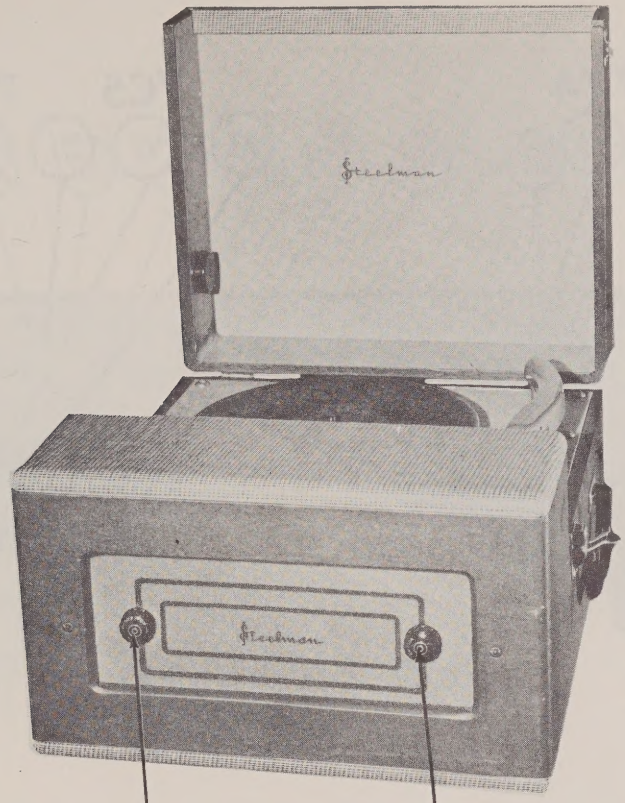

STEELMAN
MODEL 3E1

TRADE NAME	Steelman Model 3E1
MANUFACTURER	Steelman Phono & Radio Co., Inc., 12-30 Anderson Ave., Mt. Vernon, N.Y.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Manual Record Player
TUBES (Three)	Types 7F7 AF Amp., 7C5 Audio Output, 7Y4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .33 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

STEELMAN MODEL 3E1

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		STEELMAN PART No.	STANDARD REPLACEMENT		
V1	AF Amplifier	7F7	7F7	8AC	
V2	Audio Output	7C5	7C5	6AA	
V3	Rectifier	7Y4	7Y4	5AB	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	STEELMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	30	350		AFH3-110		C031		FP331	TVL-3620	
B	30	300								
C	20	25								
C2	.01	600		PR688-01	D6-103	PTE6S5	GP2-333-103	PT611	6TM-S1	Note 1
C3	.01	600		PR688-01	D6-103	PTE6S5	GP2-333-103	PT611	6TM-S1	
C4	.01	600		PR688-01	D6-103	PTE6S5	GP2-333-103	PT611	6TM-S1	
C5	.01	600		PR688-01	D6-103	PTE6S5	GP2-333-103	PT611	6TM-S1	
C6	.002	600		PR688-002	D6-202	PTE6D2	GP2-333-202	PT622	6TM-D2	
C7	.01	600		PR688-01	D6-103	PTE6S5	GP2-333-103	PT611	6TM-S1	
C8	.01	600		PR688-01	D6-103	PTE6S5	GP2-333-103	PT611	6TM-S1	

Note 1. Not used in all models.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	STEELMAN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	VC-55	Q11-133	A47-500K-S	B-59	U-50	Volume
B	Shaft		Not Req.	Not $R_eq.$	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	500KΩ	½	VC-20	Q13-133	A47-500K-Z	B-60-S	U-48	Tone
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	STEELMAN PART No.	IRC PART No.	
R3	22KΩ	½		BTS-22K	Note
R4	4.7Meg	½		BTS-4.7Meg	
R5	50KΩ	½			
R6	470KΩ	½		BTS-470K	

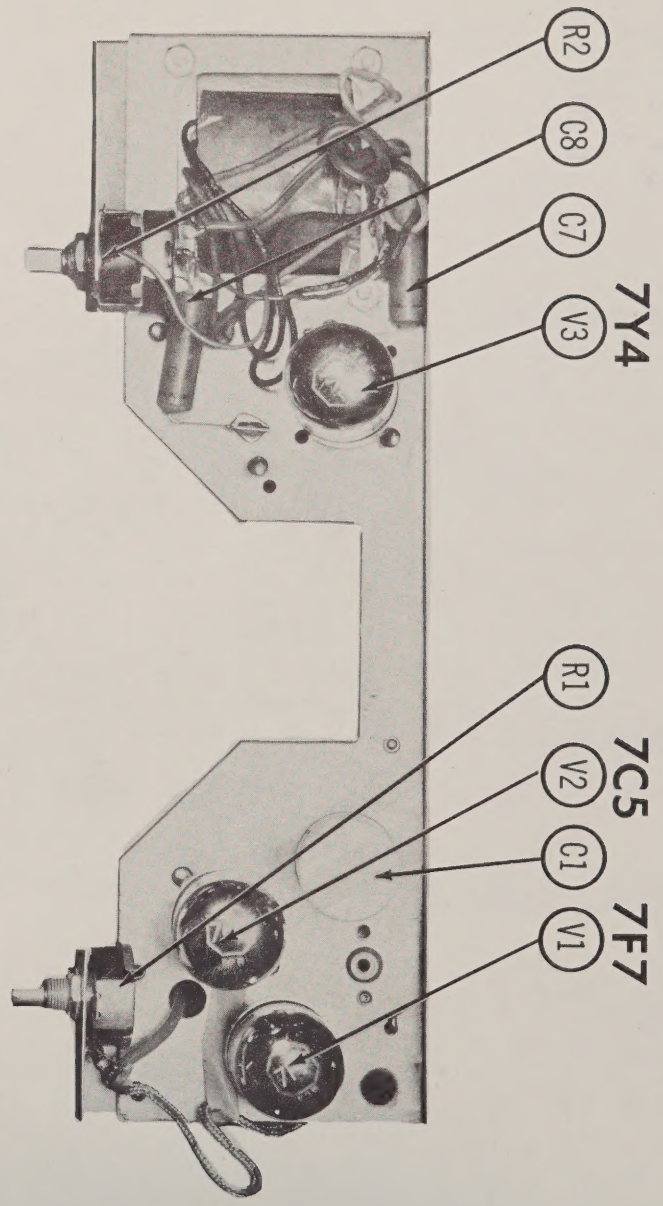
Note: Not used in all models.

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	STEELMAN PART No.	IRC PART No.	
R7	330Ω	1		BTA-330	
R8	300Ω	10			
R9	500KΩ	½		BTS-500K	Note

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	STEELMAN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @.33A	590VCT .049ADC	6.3VAC @1.22A		310	PM-8407	P-2950	R-5B	P9302	T-22R02

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	STEELMAN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	5KΩ	3.2Ω		A-3877	A-2930	S-3X	Z1001	24S51	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	STEELMAN PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6"	PM	3.2Ω	SP-60	ST-108 Mod. P6-X	6A1	

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	STEELMAN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L1	.046ADC	405Ω	5.4 Hy.		C-1707 ①	C-2975 ①	C-4X ①	C5007 ①	T-20C52 ①

① Drill one new mounting hole.

PHONO CARTRIDGE

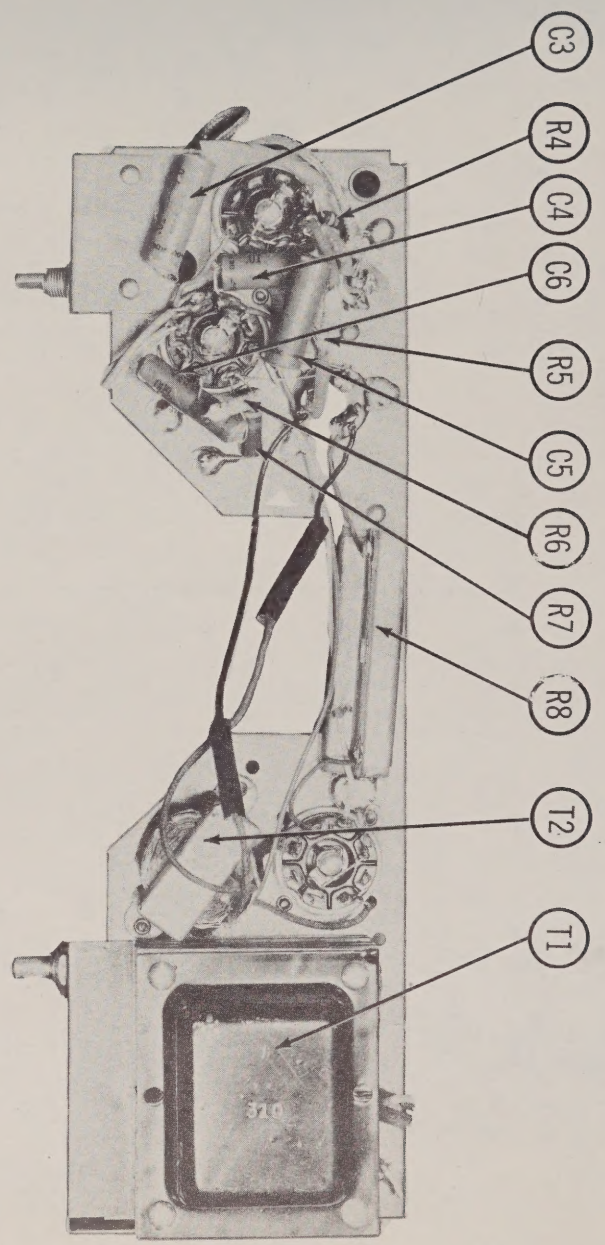
ITEM No.	REPLACEMENT DATA							REMARKS
	STEELMAN PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		*W-15L3-D				*2666-0		*Complete arm and cartridge assy.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	STEELMAN PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2		W-44 * & W-44LP *	C-433 * & A-432 *	W-26A * (or) W-26S † & W-26MGA*(or) W-26MGS †	* Metal † Jewel

CHASSIS—BOTTOM VIEW



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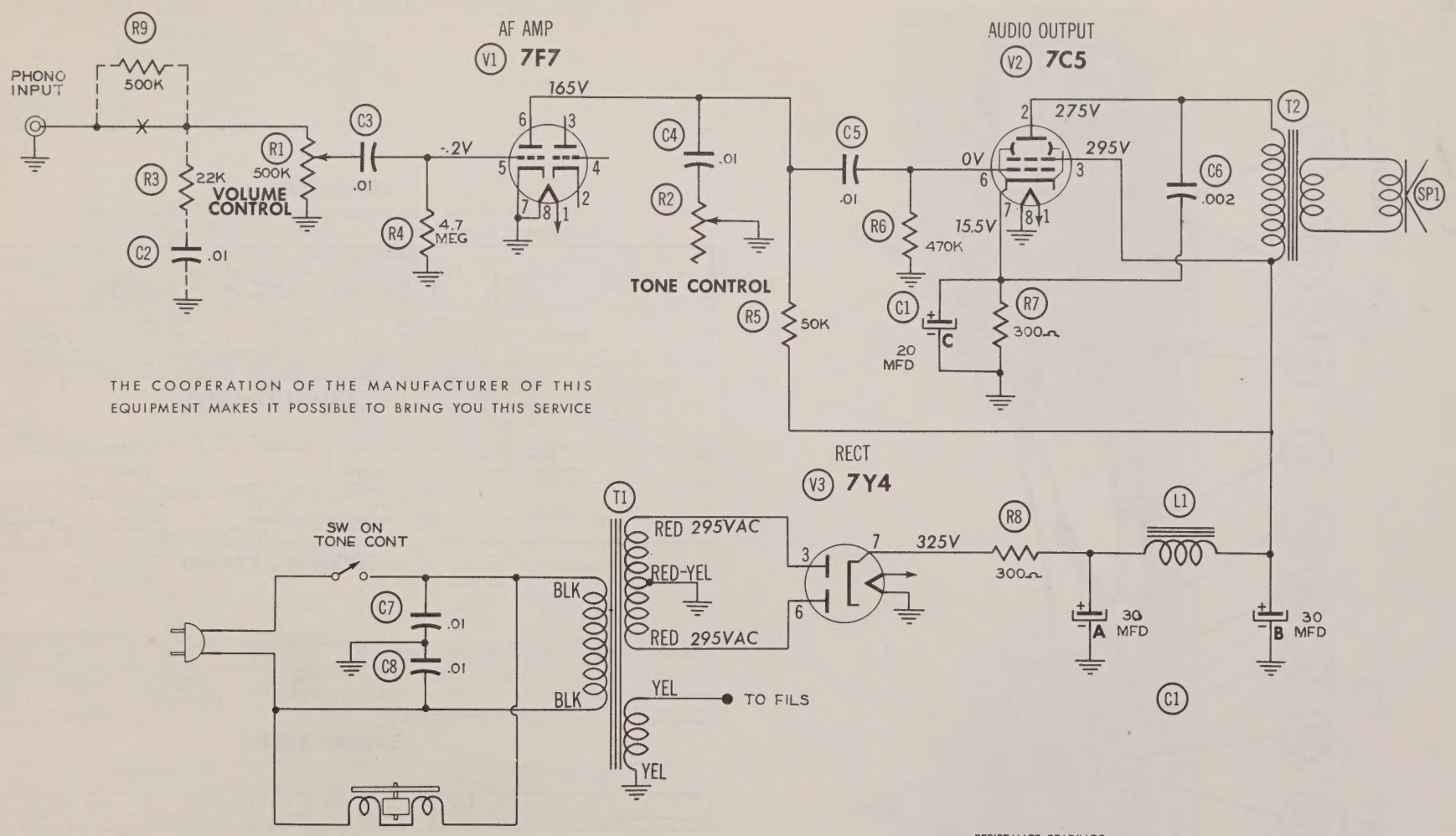
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

STEELMAN MODEL 3E1



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	7F7	.2Ω	INF	INF	INF	4.7Meg	†50KΩ	0Ω	0Ω
V 2	7C5	.2Ω	†1.1KΩ	†700Ω	500KΩ	INF	470KΩ	330Ω	0Ω
V 3	7Y4	0Ω	INF	354Ω	INF	INF	384Ω	50KΩ	.1Ω

† MEASURED FROM PIN 7 OF V3

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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